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MARCH/APRIL 1994

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ARMY AVIATION SIMULATION STRATEGY

Aviation Digest

Professional Bulletin

1–94–2 • MARCH/APRIL 1994

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Back cover: Depiction of vehicles in the fully computer-generated visual scene is extremely realistic, including this Soviet Mi–24 Hind D.

Cover: Army Aviation is ***leaping*** into the future to provide realistic training—and enhance its warfighting capability—through its new simulation strategy. As Army expands the role of simulation in training, combat, and materiel development, it is providing a higher level of training across the force at reduced costs. We are challenged to understand these vital, rapidly changing concepts that take us into the 21st century.

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Major General Dave Robinson

Simulation—Preparation for Victory

At precisely 0207 hours, right on schedule, the lead aircraft in the flight of six lifted off on the mission that would propel America headlong into armed conflict. Diplomacy had failed, and now the country looked to its military as an instrument of national power. The young troop commander in chalk three was relieved—everything seemed to be going right. As his flight approached the release point, he reflected on the armed reconnaissance to destroy enemy air defenses within a 20–by–60–kilometer zone. Was his intelligence accurate? Was the rest of the joint task force on schedule?

Despite outward confidence, an eerie feeling of discomfort lurked in the captain's subconscious. Ten years had passed since American forces had experienced combat, and much had changed. The Information Age ushered in unheard–of technologies that revolutionized the face of battle. The dawn of twenty–first century warfare brought high–tech weaponry to even the most insignificant potential adversary. Instantaneous data transfer, highly evolved space– and terrestrial–based sensors, and horrific fire–and–forget weapons made any mission absolutely treacherous.

Ironically, at the very time warfare was becoming increasingly complex, fiscal realities at home were dictating a shift in national resources from defense to domestic programs. Military forces were cut drastically and training dollars curtailed to the point where live training was at a premium. Most of the senior aviators had retired over the last years—leaving younger warriors full of spirit but short on experience. What would be the outcome of tonight's battle?

This scenario, although fictitious, indicates the future of armed conflict and decries warning of mistakes in our past. Information Age warfare is already upon us! Blue–gray technologies and highly lethal weapons, some with the effects of mass, are proliferating throughout the world indiscriminately. Anyone with hard currency can acquire state–of–the–art weapon systems from cash–strapped nations. At the same time, American military strategy relies on smaller forces equipped with advanced systems to execute joint missions at operational depth with strategic ramifications. How will the "man in the loop" fare in this technical, nonhuman combat environment? In the absence of angry metal and hot steel, how will we instill intuitive, intellectual flexibility in our young warriors and give them combat–like experience to prepare them for the challenges and uncertainty of future conflict?

Simulation will provide solutions to these pressing issues and ensure the right force is trained, equipped, and capable of decisive victory. The key is in the microchip. Revolutionary breakthroughs in computer technology are expanding our capabilities in simulation. New vistas have been opened into the realms of virtual, constructive, and live simulation. Enormous opportunities are ours to seize in training and materiel and combat development. Along with reduced spending for training, the requirement to minimize acquisition costs mandates that force developers rely more on simulation.

The future for training simulation is quite impressive. Initiatives in virtual simulation will allow us to far surpass today's combat mission simulators with networkable collective trainers like the Aviation Combined Arms Tactical Trainer (AVCATT). Constructive wargaming in Corps Battle Simulation (CBS), for division and higher headquarters, and Brigade and Battalion Simulation (BBS) are already enhancing command and control skills in our battle staffs. **Janus**, another constructive simulation, is currently being fielded to enhance tactical skills in our small units, company size and lower.

Live simulation at our combat training centers (CTCs) is honing tactical skills across our combat, combat support, and combat service support units. Devices such as the Multiple Integrated Laser Engagement System/Air Ground Engagement System II (MILES/AGES II) and the Aircraft Survivability Equipment Trainer IV (ASET IV) are challenging our tactical units with tough, realistic training. With the addition of emulators for all the battlefield operating systems, including the Joint Strategic Targeting Airborne Radar System (J–STARS), the CTCs are doing a superb job of simulating actual combat environments.

Even more revolutionary are the prospects for future technologies that will link virtual, constructive, and live simulation simultaneously and allow us to conduct realistic, multiechelon exercises at a fraction of the cost of full–up deployments. The Army's simulation strategy using Distributed Interactive Simulation architecture and protocols opens enormous opportunities to link combined arms operations with the joint services using the Defense Simulation Internet long–haul network.

Undoubtedly, Army aviation can maximize the payoff in live training by improving individual, crew, and

collective proficiency and eliminating distractors during premission simulation. More importantly, we can exercise the minds of our young leaders and develop the insight and agile–mindedness necessary for success in battle. Through experience in progressively challenging simulation, we can harness intuition—that queasy sense of almost, yet not quite knowing—to allow our leaders to make instant decisions in combat without the benefit of complete information.

In the absence of firsthand experience, simulation must recreate the crucible of combat to give battle expertise to our soldiers during peacetime. In training, leaders should expect soldiers to prove their prowess in simulation before expending precious resources such as flying hours, parts, and time. Mission rehearsals under realistic, simulated combat conditions should be the norm. This has significant wartime implications also. Commanders can adapt scenarios, terrain, and conditions and even modify enemy equipment and tactics to prepare their units for impending operations. They can set conditions for any mission on the operational continuum from Panama to Somalia—or the Balkans to Southwest Asia. Aircrews could then transfer computer data from mission–planning stations to their aircraft for execution of real–world operations.

In addition to tactical training, tremendous opportunities exist for training our maintainers. Imagine simulation that teaches diagnostic and prognostic troubleshooting of the systems aboard our advanced aircraft. Simulated faults, from the simple to complex, could be rigged on training devices or even the actual aircraft. This could be done frequently, safely, and at very low cost. Maintenance sustainment and refresher training in our tactical units would be progressive, repetitive, and effective.

As a final note to training simulation, the Army has much to gain in readiness and cost avoidance through the extensive use of simulation in our reserve components. High–quality, collective training—conducted close to home station on a frequent basis—will dramatically enhance the readiness of our National Guard and Army Reserve units. Thus, Army simulation initiatives must have a total–force focus.

In addition to training, simulation brings tremendous efficiencies to the world of materiel and force development. Without question, a big advantage to simulation is cost avoidance during development. Never before has it been more critical to fully prove new equipment and concepts than in our current fiscal climate. With each of the services competing for shrinking resources, the Army can ill afford to spend millions of dollars or waste thousands of man–hours on dead–end projects.

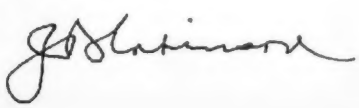
Equally important, simulation allows us to fully validate concepts for the employment of new systems, as well as verify current doctrine. Operational requirements documents (ORDs) for new and modified equipment must accurately state future need. They must be justifiable and able to withstand intense scrutiny. Likewise, corresponding concepts for tactics, techniques, and procedures must be developed in detail. Therefore, the Army must take great strides to ensure that we thoroughly validate system performance requirements and employment concepts.

Interactive simulation provides an innovative and effective bridge for combat developers and force developers to approach this endeavor concurrently. Relatively inexpensive simulation allows us to model numerous advanced system concepts without building costly prototypes. Through a systematic evaluation methodology, force developers can verify doctrine, confirm force structure, and develop exacting ORDs for equipment.

The Army's force–modernization strategy must be to "simulate before we buy, build, or fight" new systems. The Aviation Test Bed (AVTB) at Fort Rucker is Army aviation's key facility to explore new technologies through simulation. Tests are conducted to confirm concepts and equipment and provide feedback for developmental decisions. The AVTB is also aviation's link to U.S. Army Training and Doctrine Command (TRADOC) Battle Labs, Armywide simulations, and advanced technology demonstrations.

Army aviation's ultimate contribution to combined arms warfighting will be in operational art. What better fora than the TRADOC Battle Labs and warfighting simulations in Louisiana Maneuvers for aviation to lead the quest to dominate the maneuver battlefield? Aviation, in concert with the other branches, will leverage technologies across the force to achieve the "increase in combat power" charged to the battle labs by General Franks, commander, TRADOC. The key for aviation success in Army simulations is to ensure that we accurately model our systems and aggressively pursue representation in these exercises.

Like it or not, the Information Age is here to stay. Civilization and warfare have changed forever, but neither will remain static. They will evolve at a deceptive pace for the unprepared. Those without vision, who do not act with purpose, will be left behind. The implications for our nation are critical. Technology enhances the ability of our military forces to act as an instrument of national power. If our forces are to stay ahead of the competition, we must be unrelenting in our search to harness the power of the microchip. The Army can do this in its training, combat developments, and system acquisitions by converging future technologies in simulation. Only through the aggressive pursuit of leap–ahead technology will our nation produce an affordable, fightable twenty–first century force capable of land–force dominance. Army aviation will spearhead the way to decisive victory.



Feedback continues on camouflage face paint. Responses to LTC William M. Jacobs' letter, November/December issue, page 3, as well as a letter in the September/October issue, page 5, have sparked ongoing debate.

More print on paint

Here are some facts about the wearing of camouflage paint during flight operations.

Aviation Branch Safety Office, Fort Rucker, Ala.

The Aviation Branch has no formal position about the wearing of camouflage face paints during flight operations. It remains a commander's risk–assessment decision.

Program Manager's Office, PM SOLDIER, Natick Labs, Natick, Mass.

This office is unaware of any testing involving aviation personnel during flight duties and the associated risk.

• During Operation Desert Storm/Desert Shield complaints of the camouflage paint melting were surfaced.

• Camouflage paint melts at 155–160 degrees Fahrenheit.

• The flash point of the camouflage paint is 410 degrees Celsius.

• No experiments have been conducted regarding the possible degradation of personal equipment (helmet).

• No experiments have been conducted regarding the increase in radiant energy absorption from using camouflage face paint.

• Natick recommended in 1990 that the thermal radiation absorption rates of the camouflage face paint when applied to the skin be investigated even though it felt that the heat energy absorbed by the colors is not enough to burn the skin.

• The camouflage face paint formulations currently in the system consist of pigments, waxes, and oils

• The current face paint formulations are hypoallergenic.

• The pigments (face paint) may cause short–term eye irritation.

Aviation Life Support, Natick Labs, Natick, Mass.

• Inspect helmet liners; if soiled, clean as described in appropriate manuals.

Flight Surgeon, U.S. Army Safety Center, Fort Rucker, Ala.

• Camouflage face paint may cause rare incidence of contact dermatitis (rash).

• Protective mask seal may be difficult with the use of camouflage face paints.

• There appears to be no significant health threat from aviators' wearing the military camouflage sticks.

U.S. Army Safety Center Data Base (rotary–wing aircraft), Fort Rucker, Ala.

From 1 October 1982 to 15 January 1994, the U.S. Army has had 125 accidents involving 122 aircraft in which fire was present. Of those, 122 accidents—104 were Class A; 3, Class B; and 15, Class C.

–Personnel fatally injured: 160

–Personnel disabled: 173

–Total cost to the Army: $399,461,562.00

–Injury cost: $65,589,731.00

–Type of aircraft involved:

AH–1	18	AH–64	10
CH–47	13	OH–58	21
UH–1	32	UH–60	23
Other	8		

–Injuries by aircraft:

Type	Fatal Inj	Disab Inj
AH–1	14	
AH–64	1	4
CH–47	25	18
OH–58	1	9
UH–1	25	16
UH–60	27	9

Fires have not been eliminated from Army aircraft.The doctrine to train as we will fight is one we all can live with. However, the risk of in–flight and post–crash fires during combat will increase, not decrease.

The final decision for wearing of camouflage paint during flight operations remains the commander's decision. Part of that decision is the risk/cost of wearing camouflage paint during flight operations. These facts will allow commanders to make educated, informed risk–management decisions.

The temporary absence of highly trained aviators caused by eye irritation must be weighed. Obstruction to vision caused by face paints during a critical moment on an approach—with possible loss of vital Army equipment—should be weighed against the gain. Is it worth it?

CW4 Johnnie L. Allmer
U.S. Army Safety Center
Fort Rucker, AL 36362

I strongly disagree with those who advocate the wearing of camouflage face paint while conducting flight duties. I find the letter supporting that position to be very disturbing. The author endorses an unsafe practice for the perceived purpose of impressing others outside our branch. He states that wearing camouflage face paint will develop "the bond of trust" with other combat arms fellows. To think that their opinion of aviators can be influenced by something as trivial as wearing camouflage face paint while in flight insults their professionalism.

Camouflage face paint is a fire hazard. Allow me to cite an actual incident in which wearing face paint would have been a major factor. In March 1982, during engine start, a Cobra experienced an electrical malfunction that shorted out the entire wiring system in the aircraft. In a brief flash, the crew station was in flames. The fire lasted only a few seconds. In those seconds, the Nomex flight suits worn by the crewmembers were charred. Injuries suffered were first–degree burns to the backseater's face below the area protected by his visor.

I was that burn victim. While these were the least serious of burns, I can ensure you that they were still painful. I can only guess my condition had I been wearing a petroleum–based camouflage face paint that literally would have added fuel to the fire.

The author of the letter contends that wearing camouflage face paint will imbue the "warrior ethos" in aviators. This action would put soldiers at risk to make a cosmetic, decorative statement. It should not be supported. The distinguishing characteristics displayed by Army aviators in Vietnam, Grenada, Panama, the Persian Gulf, and Somalia more than prove our martial traits.

MAJ D. Mark Ferrell
Regimental Executive Officer
229th Aviation Regiment (Attack)
(Airborne)
Fort Bragg, NC 28307

Realistic, as defined by the U.S. Government–issued ***Webster's New World Dictionary, Third College Edition***, is that which is practical rather than visionary—and a realist, one who is concerned with real things and practical matters rather than those that are imaginary or visionary. I submit that Bill Jacobs is neither a realist nor a proponent of realistic training. Jacobs' ideas of how we, combat aviation, are to "imbue the warrior ethos" and "exude the same penchant for warfighting" as our combat arms brothers at the forefront of the profession of arms is so sadly misguided that I am not sure whether an attempt should be made to change them or just dismiss them altogether as asinine. I can agree with LTC Jacobs on two implied points. First, that appearance is what makes a first impression (nobody is impressed by a fat, slovenly soldier) and, second, that being prepared for any contingency is a must during any flight. To espouse the view that if we look like good soldiers we will be accepted as good soldiers is dangerously flawed. This concept of "perception" held by Jacobs and too many other officers is incorrectly emphasizing to the Army's junior leaders what is important in the conduct of realistic training and mission accomplishment.

Impressions are made upon our brethren in the other combat arms not by wearing camouflage paint on our faces, ragtops on our Kevlars, or even BDUs instead of flight suits. We earn the respect of our infantry, artillery, and armor brothers by adhering to one simple axiom—never promise more than we can deliver, and deliver more than we promise! Being at the PZ at the appointed time with the correct number of aircraft and then performing the mission is what transforms the image of a prima donna flyboy into that of a professional Army aviator.

There is a time and a place for the use of camouflage face paint, but the cockpit is not that place. We have all learned the purpose and methods of use of camouflage at the earliest stages of our military careers—be that OBC, basic training, or WOCS. It is a skill that does not diminish because of nonuse. If Bill Jacobs, or any other aviator, feels that it is necessary to wear it in the cockpit, then he or she should be allowed to—but to mandate its use as realistic training is ludicrous! Sure, all flight crew members should carry a camo stick/compact in the event they are shot down behind enemy lines and must evade capture, but unless I'm missing something, there is no value in camouflaging your face while flying an aircraft that completely masks the crewmember's body profile.

I am surprised that after recollecting the "realistic" movie, *Flight of the Intruder,* LTC Jacobs didn't

lapse into fantasy further by recalling a scene from *Rambo* of Stallone camouflaging himself in the forests of the Northwest—or maybe even one of Martin Sheen coming out of the water with his face blackened in preparation of his assault on Colonel Kurtz in *Apocalypse Now*! Until those in positions of authority can correctly prioritize what constitutes good realistic training, we will continue to struggle for acceptance as a competent professional combat arms equal in the eyes of those that depend on us for so much—in training and on the three–dimensional battlefield.

Face paint equals fire hazard. In the cockpit, it's just plain stupid!

Neal J. Edmonds
4513 Vienna Woods
Glen Allen, VA 23060

Once again we see an attempt to "camouflage" reality with fantasy and lack of factual information.

Flight of the Intruder is a movie! This comes under the classification of fiction and was produced by the same industry that gave us *Terminator*, *Spaceballs*, and *Police Academy*. Why don't we base Army aviation doctrine on the movie *Firebirds*? (They didn't wear camo on their faces.)

I am sure that most Army aviators would gladly carry the camouflage kit in their survival vest where it would be as handy to retrieve for use as your PRC9O.

I am at a loss to understand why you would want to train with camouflage on your face when it has never been put into practice by aircrews during the most recent conflicts—Grenada, Panama, Desert Storm, and Somalia. The argument to wear camouflage in the cockpit is as old and tired as the one about how we have to be like other branches. There are branches because there are differences! We should not compromise safety, sound judgment, or proven concepts just to be like somebody else. Aviation needs leaders, not followers. If someone wants to be like another branch, apply for a transfer.

CW4 Lawrence E. Pluhar
6328 W. 157th Place
Oak Forest, IL 60452

The tactical value of wearing face paint in the cockpit is dubious at best, but the issue itself does not warrant protracted debate. I respectfully take umbrage, however, with LTC Jacobs' assertion that we in the aviation business need to do such things to "exude the same penchant for warfighting as do our brethren in the Profession of Arms."

As soldiers, we are responsible for maintaining proficiency in the common tasks. As aviators, however, we should feel no special compulsion to demonstrate our mastery of these tasks to the rest of the Army to prove our worth. If we are going to rankle our flight crews by requiring them to wear face paint in the cockpit, we should do so to improve battlefield survivability—not to impress anyone. Equally fallacious is the idea of gleaning tactical wisdom from Hollywood movies.

Having spent six years as an airborne infantryman, I feel a strong affinity for our comrades on the ground. I also know how to earn their trust. The trust of the ground soldier is earned by the aviator who takes pride in his unique skills and demonstrates that pride through consummate dedication to his (or her) profession. We garner the respect of the infantryman when we extract him on time from a cold, wet landing zone in the middle of the night. We earn the gratitude of the tanker when we put a Hellfire missile into the T–72 taking a bead on him. The tanker cares not at all if the deliverer of that missile was wearing face paint. I would also contend that the pilot, mechanic, and fuel handler—who adroitly delivered such a tremendous combat multiplier to the ground commander—exuded as much "penchant for warfighting" as any tanker or infantryman—face paint or no face paint.

As aviators, we can better prove our worth on the battlefield by doing our job well than we can by exhorting our crew to look like the ground soldiers. Commanders are not required to give a reason when they tell their soldiers to don camouflage face paint, protective overgarments, or any other item. Those soldiers, however, should be confident in the knowledge that their commander would make any such decision out of tactical necessity rather than the desire to impress someone.

CW2 George E. vonHilsheimer
18 Normandy Drive
Fort Bragg, NC 28307

ALSE taking a back seat?

Army aviation life support equipment (ALSE) has once again been given a back seat to "more pressing matters"—in this instance, the creation of the new Warrant Officer Career Track, special qualifications identifier (SQI) H3, Tactical Operations Officer. As in the past when Aviation Safety Officers (ASOs) were required to "oversee the functions of ALSE," we now have a new track that will provide this function.

One problem—while Tactical Operations Officers are "overseeing the ALSE operation," who is going to see to the day–to–day functions of the ALSE section? Who is going to continue the struggle to acquire funds, maintain school–trained enlisted personnel, ensure required reaccruing crewmember training is conducted, much less perform force–modernization projects that are slated for ALSE in the near future—projects such as the new survival, evasion, resistance, and escape (SERE) vest and helmet modernization?

Tactical Operations Officers like ASOs have been given a large area of responsibility—plan, schedule, assign, coordinate, and brief approved unit aircraft missions, as well as manage unit flying–hour programs, recommend team battle and flying positions, ingress/egress routing, provide optimum ASE settings, and "oversee ALSE functions." The list of job responsibilities goes on and on. The question for those of us who have been performing out of the modification table of organization and equipment (MTOE) structure for so long is "What has changed?" With the large area of responsibility given to the Tactical Operations Officer, does the Aviation Proponency Office or anyone working in today's Army aviation really feel that Aviation Life Support Officers are a thing of the past or, once again, an unauthorized but much–needed slot that will continue to have to be filled "under the table"?

CW2 David H. Gorton
10th Mountain Division
Fort Drum, NY 13602–5230

Aviator badge policy—change for the better?

This letter is in response to Headquarters, Department of the Army, message 111345Z Jan 94, change of eligibility for Army senior and master aviator badges. Under the guidelines of this message, the new requirements for senior wings are 1,000 hours and 84 months of total operational flying duty credit—and 2,000 hours and 120 months for master wings. This has reduced the requirement for master wings by more than 33 percent, a significant decrease. Now an aviator will attain his master status at 10 years and, assuming that he is a career soldier, will have no further increase over the next 20 years. In today's modern Army, with the advent of state–of–the–art flight simulators and a reduction in funds for flying hours, I can see a valid argument for the reduction in the total number of hours required. I cannot see, however, a cause for a reduction in number of years required to obtain those badges. The old 15–year requirement for the master badge represented an aviator who had multiple duty assignments, usually at least four; advanced schooling; and job assignments above company level. With the current guidance, senior O–3s and junior W–3s, with possibly no more than two assignments at company level, will have the master badge. Neither the Air Force nor the Navy have considered reducing the requirements for their aviators. It seems that current Army policy has turned the coveted and highly respected senior and master aviator badges into easy–to–get "bolo badges."

CW4 Mark C. Rowse
Master Army Aviator
B Company, 4–123d Aviation Regiment
Fort Richardson, Alaska 99505

Blackhorse reunion

The Blackhorse Association of the 11th Armored Cavalry Regiment will be the host of the twenty–fifth annual reunion of the 11th Armored Cavalry at Fort Knox, Ky., 17–18 June. Former members of the famed Blackhorse Regiment—service in peace or war and trooper, noncommissioned, warrant, or commissioned—are invited to attend. COL William Scott Wallace, 55th and last commander, is the scheduled guest speaker. For more information, contact Bill Squires, P.O. Box 11, Fort Knox, KY 40121, or call 502–351–5738/0933.

Meeting on nondestructive testing

The 43rd Defense Working Group on Nondestructive Testing (NDT) will be 31 October–4 November, at the Radisson Hotel in Indianapolis, Ind. The working group is sponsored this year by the U. S. Navy's Weapons Center in Crane, Ind. It has proven to be an excellent vehicle for information exchange, problem–solving, and discussion of new technology. At this time, a call for papers for presenting an NDT problem or technical paper by U. S. Government personnel or contractors sponsored by the U. S. Government and approved by the working group steering committee is being put out.

Respondents to the call for papers should submit abstracts no later than 15 July to—

Ms. Nancy Gilenwater
CODE 50551
Naval Surface Warfare Center
Crane, IN 47522

Microwave conference

The Seventh National Conference on High Power Microwave Technology will be 31 October–4 November at the Naval Postgraduate School, Monterey, Calif. This conference is sponsored by the Space and Naval Warfare Systems Command and the Naval Research Laboratory, Washington, D.C. The theme of the conference is "HPM Technology in Transition." It will provide a forum for technical exchange in both narrowband and wideband source technologies, system effects, and mission applications. Members of the Department of Defense and other Federal agencies, industry, and academia are invited. The conference and its proceedings will be classified SECRET/NOFORN/WNINTEL. For more information, write to the HPM Conference Registration Office, P.O. Box 2218 Suffolk, VA 23432; phone 804–255–0409 or fax 804–255–0056.

Defense Attache System

If you're an active duty Army noncommissioned officer (NCO) in the grade of E–5 through E–8 and are looking for an exciting, challenging, and rewarding new career field—then consider an assignment with the Defense Attache System (DAS).

The DAS is now recruiting only the most qualified NCOs seeking Joint Service Staff assignments within American embassies in more than 80 locations throughout the world. Selected NCOs are given the opportunity to represent the U.S. Army and the Defense Intelligence Agency while serving in diplomatic assignments within Europe; North, Central, and South America; Africa; the Far East; and the Middle East.

SSG Linda Peterkin is Army Attache Management's enlisted assignments manager. According to SSG Peterkin, "No other Army program provides soldiers with the opportunity to live and work in so many different countries as well as experience so many diverse and unique cultures. From Austria, Brazil, and Canada to Zimbabwe, Finland, and Turkey, these worldwide diplomatic assignments offer unmatched opportunities and challenges."

NCOs considering attache duty must be on active duty; qualify for a top–secret security clearance; have a GT (General Technical) score of 115 or higher, a CL (Clerical) score of 120 or higher, and a typing score of 40 words per minute or higher; and be familiar with the latest personal computer word processors. Soldiers must also test 100 or higher on the Defense Language Aptitude Battery. All family members must be U.S. citizens and meet the medical standards for the country of assignment.

Prerequisites, application procedures, and countries available within the program can be found in Army Regulation 611–60. For more information, contact SSG Peterkin at (commercial) 410–712–0137, extension 2633, or (DSN) 923–2134, extension 2633.

Correction

A caption in the January/February 1994 issue, page 27, top left figure, should be corrected to read "Warrant Officer 1 Michael W. Risher takes a look at the tail of the aircraft."

ARMY AVIATION SIMULATION STRATEGY—A ROAD MAP TO FUTURE TADSS

Mr. Alan R. Keller
Plans Officer, Headquarters
Directorate of Training, Doctrine, and Simulation
U.S. Army Aviation Center
Fort Rucker, Alabama

New Technologies

The Army is leaping into the 21st century through the innovative application of several new technologies. One of these new technologies—Distributed Interactive Simulation (DIS)—will revolutionize our approach to training; military operations; and research, development, and acquisition (RDA). DIS will create synthetic environments by interconnecting geographically dispersed simulations and linking different types of simulations. By using DIS, we can simulate the battlefield for individual soldiers–in–the–loop and units all the way up to theater–level, joint service, combined arms exercises.

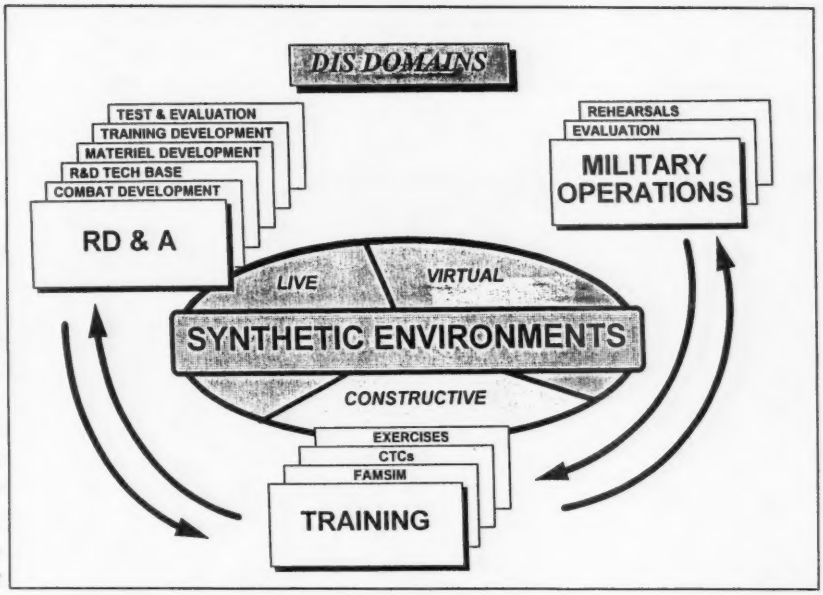
Expanding Role of Simulation

The thrusts of Army aviation's simulation strategy dovetail with the Army's efforts to provide leadership to develop DIS through a concept known as Battlefield Distributed Simulation–Developmental (BDS–D). Army aviation always has been a leader in using simulation for training. BDS–D is quickly expanding the domain of simulation into mission rehearsal; testing; and combat, materiel, and training development. Army aviation simulation strategy provides a road map to develop and procure training aids, devices, simulations, and simulators (TADSS) necessary to support future aviation requirements.

Army Aviation Simulation Strategy Tenets

Seven basic tenets have emerged to characterize the new Army aviation simulation strategy as follows:

- Support aviation systems in the Army Aviation Modernization Plan (AAMP) and the Aviation Restructuring Initiative; and include the appropriate TADSS in the Combined Arms Training Strategy (CATS).
- Integrate programs into DIS so the benefits of the Combined Arms Tactical Trainer (CATT) program and BDS–D complement training, development, and testing.
- Expand individual and crew training focus to include combined arms collective training and mission rehearsal.



• Prepare the Aviation Test Bed (AVTB) for future Advanced Technology Demonstrations (ATDs); virtual prototyping; and warfighting simulations, such as the Louisiana Maneuvers (LAM).

• Consolidate resources and use reconfigurable cockpits, common semiautomated forces (SAFOR), computer hardware, and reusable software.

• Maintain the Advanced Rotary Wing Aircraft (ARWA) as the priority RDA fast–track program leading to the Aviation Combined Arms Tactical Trainer (AVCATT), AVTB upgrades, and future aircrew sustainment trainers.

• Be active players on simulated battlefields.

Simulation in Training

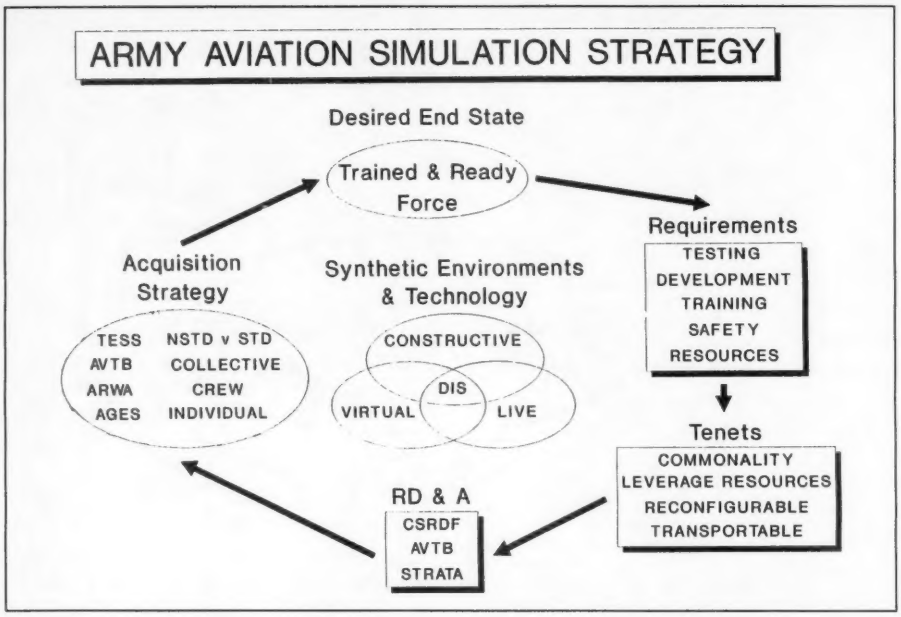
Warfighting is the central theme for the developing simulation strategy. Army aviation simulation will continue to use current and planned aviation systems, configurations, mission equipment packages, tactics, and doctrine as a foundation for TADSS strategy. Priority for TADSS will center on the aviation forces outlined in the AAMP with training requirements being determined by the aviation CATS. Significant effort is being made to ensure collective and crew training has top priority; aviation's taking part at the combat training centers (CTCs) is of the utmost importance. The bottom line is to ensure appropriate state–of–the–art TADSS are available for aviation units training to fight as members of the combined arms team.

• **Individual and Crew Training Simulation.** In the post–Vietnam era, Army aviation TADSS have made a significant contribution to training. We have developed effective flight simulators, combat mission simulators, and part–task trainers for training individual aviators, crewmembers, and maintainers. These devices permit us to evaluate student performance better; provide a safe environment; save on the cost of fuel, maintenance, and parts; and lessen the adverse environmental effects of low–level flying. We must continue to develop training simulation for individuals, aircrews, and maintainers to attain and sustain skills necessary to accomplish their mission.

- **Individual training** will be provided through Computer–Based Instructional (CBI) systems, which include authoring stations for software development and rapidly reconfigurable part–task trainers for system switchology training.

- **Crew training** will be provided by flight simulators, combat mission simulators, and embedded training devices. Crew training simulators might be fixed–based and full–motion at the institution, but should be mobile or transportable for unit training. During Operation Desert Shield, we learned AH–64 Apache warfighters need a mobile combat mission simulator that can be moved to their base location.

• **Combined Arms Collective Training Simulation.** The ability to perform as an individual aviator or crewmember does not guarantee the ability to function as a member of an attack helicopter company. Army aviation simulation training programs must provide Army aviators with a means to experience battlefield conditions, while they perform collective task training and mission rehearsal. These training programs must be integrated into the CATT family to ensure we receive the benefits of DIS technology. The AVTB is the centerpiece for Army aviation warfighting simulation efforts. Training, testing, and warfighting simulations are conducted routinely with exciting results. Although primarily a research and development facility, the value of conducting combined arms collective training in the AVTB has surpassed the expectations of everyone concerned. Aviation units at Fort Rucker, Ala., can execute situational training exercises from their mission training plan. Professional development course students can gain valuable training benefits from the AVTB. This technology provides an excellent after–



action review capability with immediate replay of individual actions.Collective training TADSS will be used in all three types of simulation.

-Virtual simulation. By using virtual simulation, aviators can perform attack helicopter battalion, collective task, practical exercises to enhance warfighting skills. This training is an important stepping stone to field training exercises and CTC experiences. These exercises will allow for performance evaluation, improve unit cohesiveness, provide a safe environment, and aid in developing the commanders' training strategy. The AVCATT is the aviation component of the CATT family of collective training simulators. Army aviators will experience task loading and achieve unit cohesiveness by fighting collectively in the AVCATT. Special emphasis is being placed on ensuring aviation forces are provided the best collective training possible to prepare them to fight as members of the combined arms team.

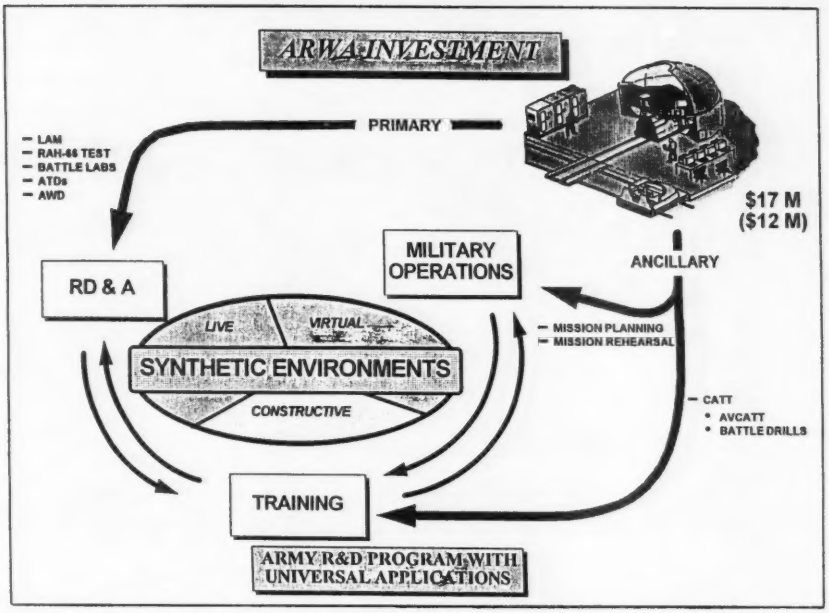
-Live simulation. The use of the following devices/systems at the CTC will further enhance the collective training capabilities of our units: Embedded training devices; the Aircraft Survivability Equipment Trainer (ASET) IV system; Multiple Integrated Laser Engagement System/Air Ground Engagement System (MILES/AGES) II; and the Tactical Engagement Simulation System (TESS). MILES/AGES II provides real-time casualty assessment during force–on–force unit collective training exercises. TESS replicates fire–and–forget Longbow Hellfire in training exercises.

-Constructive simulation. A warfighting simulation center at Fort Rucker will house all of the constructive simulation training and development capabilities available. JANUS was fielded in February 1994. It will be followed by brigade and battalion simulation in fiscal year (FY) 1995. Also, it is envisioned other significant simulation models will be added in the near–to–midterm, such as: the Joint Surveillance Target Attack Radar System; Aviation Mission Planning System; Variable Intensity Computerized Training System; Eagle; and the Interactive Battlefield Dynamics–Simulation for aircraft survivability equipment (ASE).

Simulation in Development Programs

We must keep pace with the significant technological advances being made in the use of simulations to support combat, materiel, and training development, and testing. To do so, a Warfighting Simulation Division has been established at the U.S. Army Aviation Center, Fort Rucker. The AVTB, Simulator Training Research Advanced Test Bed for Aviation, and the Crew Station Research and Development Facility are being used as centerpieces for the warfighting simulation development effort. Significant effort and interest are focusing on preparing the aviation community to take part in: the upcoming LAM; U.S. Army Training and Doctrine Command (TRADOC) battle labs; antiarmor ATD; Joint Precision Strike Demonstrations; Warbreaker; and virtual prototyping of future aircrew sustainment trainers.

- **Simulation in Acquisition.** Simulation will play a greater role in acquisition strategies. The Assistant Secretary of the Army for RDA has published a policy memorandum requiring all acquisition strategies for Acquisition Category I and II programs to have a simulation support plan. This plan will explain the simulation approach, strategy, and rationale for the use of constructive, virtual, and/or live simulation under the Army's Modeling and Simulation (M&S) and DIS programs.



• **AVTB Upgrades.** BDS–D requirements will be centered around preparation of the AVTB to satisfy developmental and testing requirements for the modern aircraft weapon systems. The goal of the simulation of aircraft mission equipment packages is to include: weapons; sensors; navigational equipment; ASE; and communication systems, operating at night as well as during the day, and to include adverse weather and obscurants. Verification, validation, and accreditation of these BDS–D simulations are critical.

• **Commonality and Consolidation of Resources.** Science and technology advances in the use of simulation are occurring daily, much to our advantage. Much is to be gained by the use of common simulation components. We must have the vision to take advantage of this development. Likewise, our strategy has to be in balance with the availability of resources. Therefore, the aviation community will benefit mutually from a strategy emphasizing consolidation of resources to take advantage of reconfigurable cockpits, common SAFOR, reusable software, and common hardware. Resourcing for future TADSS is a significant challenge as dollars are reduced, requiring sound, innovative management decisions. Limited resources, however, also highlight the significance of what can be accomplished through the use of simulation. Common sense and fiscal realities call for a consolidated simulation strategy throughout the aviation community.

• **ARWA Program.** ARWA is an attempt to pull together multiple ongoing simulation efforts with common goals to include software design and development, hardware design, and DIS standards. These integrated efforts will help in designing flexible, reconfigurable crew stations and allow for efficient implementation of new designs and requirements. The Aviation warfighting cell, consisting of Longbow Apache and Comanche cockpits, will serve to jump start ARWA. The introduction of these new requirements would not only cover quality designs (a benefit when lifecycle cost is considered in the design), but would allow for quicker response and implementation times over what has occurred in prior programs. The bottom line is that ARWA should be pursued if it makes sense to—

-Explore technology that would make development of AVCATT cheaper and/or quicker, or

-Explore technology that would make the development of training systems/devices for any given aircraft or weapons system better, cheaper, or quicker, or

-Conduct experimentation leading to better insights on acquisition decisions for: Longbow Apache; Comanche; future ASE; advanced avionics; and command and control capabilities; or

-Use the AVTB as the aviation centerpiece for LAM, battle labs, ATD, and Advanced Warfighting Experiments.

Conclusion

Advances in Army aviation simulation training will increase the potential for conducting effective individual, crew, team, and combined arms collective training. Advances in technology also will enable simulation to continue making inroads into training, combat, and materiel development; and testing. By the year 2000, the Army will construct and demonstrate a robust variety of synthetic environments to improve simulation significantly at all levels. Included will be the networking of manned virtual simulators, live simulation at the CTCs, and constructive models like Warfighters' Simulation 2000. These efforts will network fully the theater-level, simulated battlefield and allow Army aviation to be an active player at all appropriate levels.

COMBINED ARMS TRAINING STRATEGY AND SYSTEMS APPROACH TO TRAINING IN SUPPORT OF TADSS

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and

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Have you ever wondered why the simulator or training devices you use in your unit were developed? What about those used in the school? Training aids, devices, simulators, and simulation (TADSS) do not just happen—they are chosen. Various procedures were used in the past to choose TADSS. The Army now uses two interrelated processes to decide which TADSS are necessary and how they will be used: the Combined Arms Training Strategy (CATS) and the Systems Approach to Training (SAT).

The SAT is the U.S. Army Training and Doctrine Command (TRADOC) training development process (see figure). Using the SAT, Aviation Center training developers decide what, when, where, and how individual and collective (crew, team, unit) tasks are to be taught. The SAT is a continuous process consisting of five interrelated phases: analysis, design, development, implementation, and evaluation. Each phase is initiated long before actual training implementation takes place. These phases are updated continuously as more detailed information allows documentation to move from the general to the specific.

The analysis phase determines what collective (crew, team, unit) tasks and individual tasks are required to support current and future Army missions. New equipment, force organization, and doctrine are some of the elements that cause new or changed tasks. Individual tasks are published in two soldier training publications (STPs). Officer tasks are in military qualification standards (MQSs) and enlisted tasks are in the soldier's manual (SM). Unit/Collective tasks are published in an Army training and evaluation program (ARTEP)/mission training plans (MTPs).

When, where, and how to train strategies, for both individual and collective training, are determined in the design phase. The use of TADSS is part of the design phase. Design decisions are present in numerous documents. Documents such as an operational requirements document (ORD) and the TRADOC Long-Range Plan are broad and general. The ORD describes the needed performance of a new system and addresses training assumptions, including TADSS strategy. Other documents have various levels of detail and are produced and updated at

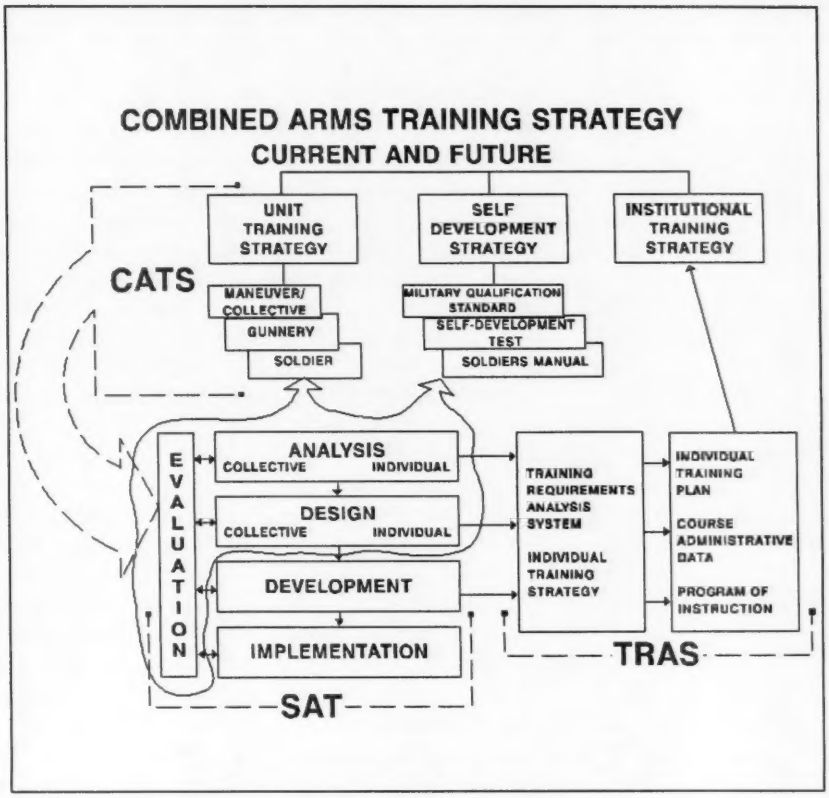

Figure. CATS and SATS

varying times, ranging from 8 to 10 years to 6 months in advance of need. These management documents support various levels of requirements; i.e., unit, system, military occupational specialty/specialty code, course, and block of instruction. Design phase training decisions, including TADSS, are incorporated into MTPs, system training plans (STRAPs), new or displaced equipment training plans (NETPs/DETPs), individual training plans (ITPs), programs of instruction (POIs), and lesson plans. What is needed, when, where, and how to use media TADSS are decisions written into these various documents. The aircrew training manual (ATM) documents a unit's use of TADSS as part of the total training strategy.

In the SAT development phase, training materials are produced. Lesson plans, flight training guides, handout materials, and instructional aids complete the three SAT phases for developing institutional instruction. For field training, the school supports the soldier and commander with correspondence courses, television, computer–based training, training support packages, and TADSS. The training materials provide trainers the details on how to use TADSS to support training. The ATM and ARTEP/MTPs define training in field units.

The actual training or instructional phase is called implementation.

The evaluation phase is continuous throughout SAT. Evaluation results may initiate changes in the other phases. External evaluations, including ARTEPs and skill development tests, are used to determine how well the current strategies meet the needs of the field. Internal evaluations look at the school and the training development processes. Evaluations identify what changes are needed in future aviation training strategy.

The SAT process produces three documents—ITP, course administration data (CAD), and POIs—that describe individual training strategy.

These documents support the Training Requirements Analysis System (TRAS). The TRAS documents course lengths, ammunition, personnel, facilities, equipment, and TADSS course requirements. Present and future courses are identified so that resources can be provided to support training at the school.

The Army has recognized a need for a strategy that identifies training requirements and develops, acquires, and manages the resources necessary to execute a Total Force training strategy, including TADSS. In these times of budget cuts and force reductions, the Army's training strategy and support requirements must be clearly defined and articulated. The concept that will meet this need is the CATS.

The SAT process is the foundation for building the CATS. The analysis and design phases apply particularly to the development of CATS. The evaluation phase can be used to determine how well current strategies meet the needs of Army training. Through evaluation, we determine what changes are needed for future CATS.

The CATS captures the strategy on how the forces will train. It provides guidance on how the mix of training resources (ammunition, operational tempo (OPTEMPO), ranges, maneuver areas, combat training centers, and TADSS) will be used in training the combat force. With the use of CATS, the Aviation Branch is able to identify, manage, and program the acquisition of training resources. Resources identified through CATS become the priority for resource allocation.

The U.S. Army Aviation Center (USAAVNC), as proponent for aviation, has developed baseline and future training strategies. The groundwork of the CATS is proponent–generated unit and institutional training strategies. Aviation unit training strategies consist of three supporting training strategies:maneuver, individual soldier, and gunnery. The centerpiece of each supporting training strategy is a matrix of training events, their frequency, and required resources. By showing these training events, CATS illustrates the relational values of training resources to required training standards.

Unit strategies are not directive but descriptive in nature. The commander can tailor unit training based on geographical location and mission essential task list (METL). Descriptive unit strategies recognize that, while there may be a "best" way to train to standards, it is unlikely all units across the Army will have adequate resources to execute the strategies precisely as described. The commander makes value judgments on resource tradeoffs to determine how he will train his unit to standards.

Computer software programs have been developed to assist the USAAVNC training developer to document CATS strategies. This automated Training Strategy Support System (TS^3) was used to submit, to the Aviation Branch, future training strategies and becomes a part of the requirements for the fiscal year 1996–2001 Program Objective Memorandum. Initiatives are underway to integrate the TS^3 software into the Standard Army Training System program to give the school training developer and units in the field a means to communicate requirements.

The aviation institutional strategies define resource requirements for training individuals to standards. It illustrates linkage between institutional and unit training. It shows how training in the institution supports the individual skills and knowledge needed in the field. The SAT–developed POIs and CADs describe what individual tasks will be trained. The ITPs describe present and proposed future training. The ITPs are used as the basis for future CATS institutional strategy. Development of the electronic software—POI Management Module (POIMM)—will provide proponents the capability to submit the CAD and POI through the Automated Systems Approach to Training (ASAT) program. The POIMM program enables training developers to extract the CATS resource requirements from the database.

The CATS does not represent a totally new direction in Total Army training management and resource management. It is an umbrella concept that embraces principles and concepts outlined in existing doctrinal manuals, training manuals, and resource management plans. The CATS is progressive; it is refined to continuously reflect changes in threat, technology, budget, and mission. It is developed in coordination with major Army commands/commanders–in–chief, the National Guard, and the Army Reserve.

The future CATS is the basis for justifying the development and acquisition of new TADSS. Future strategies, derived from SAT analysis and design, along with future warfighting doctrine and concepts, assist in writing the ORD for TADSS supporting a specific weapons system. Any TADSS supporting general military training, or training of more than a one–item system, is called a nonsystem device.

With the congress becoming more sensitive to the acquisition of costly training resources, the Army leadership must be able to show how and where training resources support "Total Force" training. The CATS gives our leadership information to make the hard choices on training resources needed to support the training strategy.

THE AVIATION COMBINED ARMS TACTICAL TRAINER

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The size and structure of the Army is rapidly changing. The defense budget is shrinking. The roles and missions of the Army are becoming more nontraditional and span a wider spectrum than ever before. During these rapidly changing times and during the even more unpredictable future, commanders are challenged most to train their soldiers. They must provide tough, realistic mission–oriented training in a task-loaded, stressful environment. Only with this type of training can our forces truly be ready for the next conflict or crisis.

While it may seem commanders are faced with an insurmountable task, one important factor is working in their favor—technology. Just as the weapons systems are becoming more high–tech, our ability to train for the employment of these systems also is becoming high–tech. With advances in interactive simulation, Distributed Interactive Simulation (DIS) in particular, commanders can provide tough, realistic, mission–oriented training and still remain within budget constraints.

Imagine being able to conduct company–level combined arms exercises on a battlefield 100 kilometers (km) by 300 km. Environmental conditions ranging from day–to–night and clear–to–obscured (including rain, fog, snow, and smoke) would be adjustable to fit the training scenario. Your unit could fight over various terrain data bases, conduct mission rehearsals, and conduct meaningful after action review (AAR) sessions. Restrictions on the use of lasers and terrain would no longer be a limiting factor. Use of ammunition and fuel would be limited only by the ability of the S–4 to keep up with the tactical exercise and provide it within doctrinal constraints. Units would fight against a challenging opposing force. This would be possible without ever leaving home station or consuming that precious operating tempo.

The Combined Arms Tactical Trainer (CATT) program provides the solution not only to aviation's training challenges but to all branches of the combined arms. Components of the CATT program include: the Close Combat Tactical Trainer for armor and infantry; the Engineer Combined Arms Tactical Trainer; the Air Defense Combined Arms Tactical Trainer; the Fire Support Combined Arms Tactical Trainer; and the Aviation Combined Arms Tactical Trainer (AVCATT). Each of these training systems will interact with each other through Long Haul Networking (LHN) (figure 1). In this way, each of the

branches will conduct true combined arms training.

Throughout Desert Storm and other conflicts, Army aviation has proven itself as a vital maneuver force. It is evident modern attack, reconnaissance, and assault aircraft, coupled with tough realistic training, are significant combat multipliers. For that exact reason, AVCATT will be an integral component of the CATT program. AVCATT will allow attack, reconnaissance, and assault units to conduct tough, realistic warfighting training in a combined arms arena. Computer simulation and modeling will allow Aviation to fight on the same synthetic battlefield alongside the other branches: Armor, Infantry, Field Artillery, Engineer, and Air Defense.

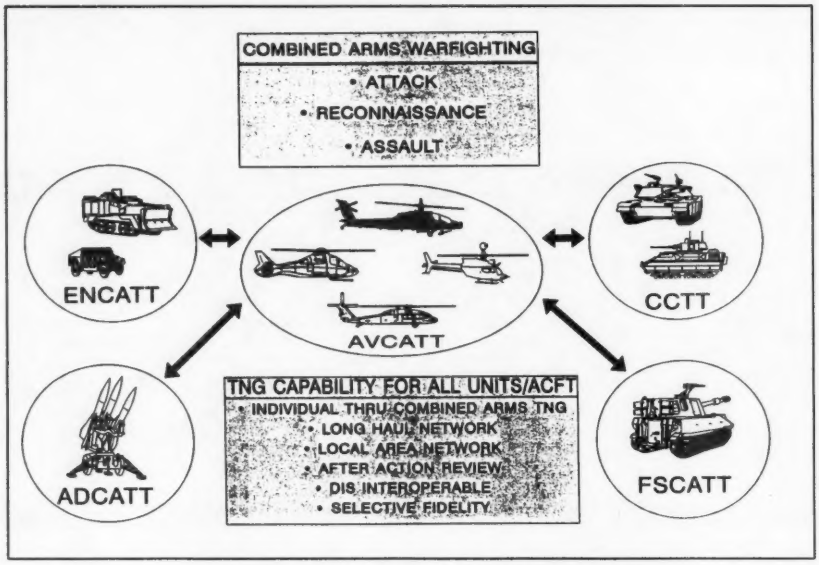

Figure 1. Components of the CATT Program

When AVCATT is fielded,a group of fully interactive, networked simulators and emulators will replicate attack, reconnaissance, and assault units. The system will be fielded to 14 installations/sites (figure 2). This fielding plan was designed to best support the 4 corps and 20 divisions under the Aviation Restructure Initiative. An AVCATT site will consist of cockpit modules for the appropriate type of unit, battalion staff work stations, an operations monitor station, an AAR system, and a semiautomated forces (SAFOR) system. The AVCATT will operate on either a local area network (LAN) or LHN (figure 3).

An AVCATT site will have cockpit modules to configure either as an attack company, reconnaissance troop, or assault platoon, depending on the scenario for the day. Cockpit modules will be produced for the Apache, Longbow Apache, Comanche, Kiowa Warrior, and Black Hawk.

Aircrews operating the cockpit modules will train in a fully interactive, combined arms environment. They will fight as a unit, with the other branches of combat arms, against a doctrinally correct SAFOR. This SAFOR will be a fully programmable, intelligent force, up to regimental size. Just as the opposing forces (OPFOR) at the National Training Center provide a formidable challenge, the SAFOR in AVCATT, and the other CATT systems, will provide an equally formidable challenge. The SAFOR system will require minimum human involvement. A trained SAFOR operator at a control station will be able to input commands to the SAFOR and help it make decisions. This will ensure units are provided the most challenging OPFOR throughout their training period.

The AVCATT also will exercise and train battalion staffs. The

AVCATT			
SITE	UNIT CONFIGURATION		
	ATTK CO	RECON TRP	ASSLT PLT
FORT RUCKER	X	X	X
FORT BRAGG	X	X	X
FORT STEWART	X	X	
FORT HOOD	X	X	X
FORT CAMPBELL	X	X	X
FORT CARSON	X	X	
FORT DRUM	X	X	
FORT BLISS		X	
FORT RILEY	X	X	
USAREUR	X	X	X
KOREA	X	X	
HAWAII	X	X	
EATS	X	X	X
WATTS	X	X	X
TOTAL AVCATT SITES: 14			

Figure 2. AVCATT Distribution Plan

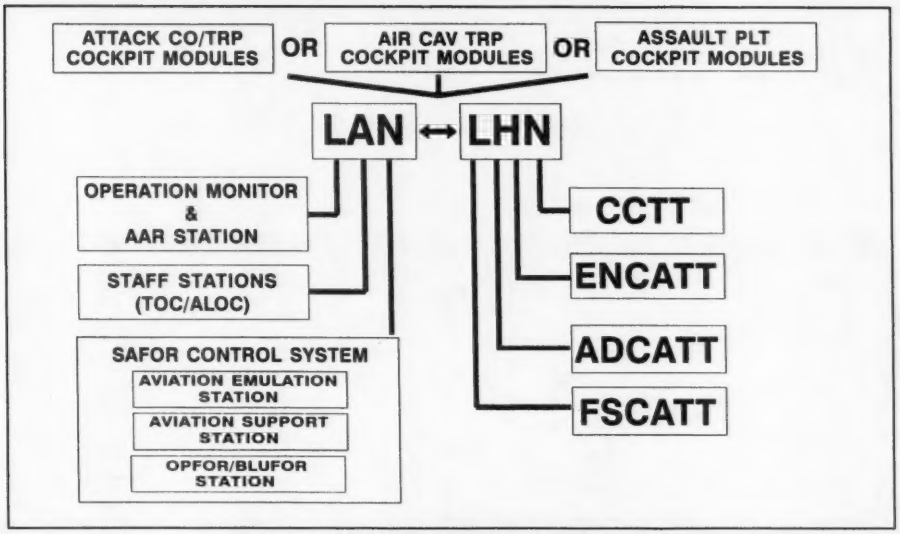

Figure 3. AVCATT operating in LAN and LHN

system will have a full tactical operations center (TOC) and an administrative and logistic operations center (ALOC). In the TOC, AVCATT will have staff stations for the following officers: operations, fire support, engineer, air defense, and intelligence. Each of these staff sections will conduct activities as they would during actual operations. The TOC's major purpose will be to drive the simulation from the top down. It will coordinate and maintain communications with higher, lower, and adjacent units. The ALOC will be the focal point for all combat service support actions and will replicate all logistical efforts within the battalion.

Commanders will be able, literally, to see the battlefield through the application of the operations monitor station. This will give commanders an unparalleled ability to see operations as they occur. In this way they can understand better problems associated with the "fog of war" and techniques to overcome it. Commanders will be able to monitor operations in real time as they occur. For centuries the successful commanders were those who could "see the battlefield." The operations monitor station will provide commanders a medium to train and exercise this trait so often associated with successful military leaders.

The final, and quite possibly the most beneficial, component of an AVCATT site is the AAR station. After a unit has completed a training session, it will have the chance to review and critique not only what went wrong but what went well. Units will learn, literally, from their mistakes and successes. The AAR system will record unit movement, weapons engagements, hits, kills, ammunition expended, communications, combat support, and combat service support operations. The system will provide an audio, video, and data printout record of the training session.

The benefits of AVCATT do not stop at combined arms training. Besides tough, realistic, combined arms training, AVCATT provides the commander and trainers with another benefit. With advances in technology, it is now possible to develop an aviation trainer that can provide both collective and individual/crew sustainment training. AVCATT will accomplish this.

In AVCATT, crews will experience the cockpit, weapons characteristics, mission equipment packages, and flight characteristics of the actual aircraft. When not operating in a collective mode, air crews will use the AVCATT cockpit modules to conduct individual/crew sustainment training. Thus, AVCATT will provide an effective media to bridge the gap between critical training needs, both individual and collective, and resources.

AVCATT is a critical element of the Combined Arms Training Strategy and will change forever the way we train. Units will train at a cost that can be resourced, in a multitude of environments, and in complete safety. When the first AVCATT is fielded in FY 2001, commanders no longer will rely solely on combat training centers and field training exercises to elevate their units to a state of excellence. With AVCATT, commanders will be able to keep their units in the training state of excellence year–round. When units arrive at a CTC, they already will be in the band of excellence. The CTC will serve as a stage for fully trained units to demonstrate and exercise skills and proficiency.

OPERATIONAL TESTING OF AIRCRAFT SYSTEMS IN SIMULATION

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Operational testing of future systems will involve an intermeshing of the constructive, virtual, and live simulation domains. Constructive simulations (JANUS, CASTFOREM) have long been the cornerstone of the cost and operational effectiveness analysis (COEA) and other analytical processes. In the virtual domain, soldiers use weapon system simulators to fight a piece of the battle. The live domain involves soldiers' fighting the actual equipment in operational vignettes.

The operational test (OT) process focuses on how the weapon system will be fought. It begins with the doctrine under which the Army fights. Deficiencies in battlefield capabilities (which cannot be alleviated by changes to doctrine, training, or leader development) generate the need for materiel system developments. Requirements for the materiel system, documented in the operational requirements document (ORD), identify key weapon system characteristics that will provide the needed capabilities. Doctrine and weapon system characteristics are melded to enable the combat developer to create the critical operational issues and criteria (COICs). The COICs address the operational capabilities critical to battlefield success and are the focus of OT.

Testers and analysts in the evaluation process use doctrine and the ORD characteristics as the basis for everything they do. The modeler for the COEA and other constructive simulation applications uses doctrine to develop employment scenarios. Key operational characteristics from the ORD are modeled to define the weapon system capabilities in the battle. The operational tester uses the COICs, doctrinally developed and focusing on key ORD characteristics, as the basis for all testing. Thus, the OT focuses on how to fight the weapon system; the ORD, COICs, and COEAs form the critical path of a single, coherent process. Implementation of this process depends on a successful merging of the constructive, virtual, and live domains of simulation.

THE CONSTRUCTIVE DOMAIN

The first step in the process is to identify the scenario and the threat to be played. A battalion or larger size force should be used on a validated/verified (V/V), constructive battlefield. With the blue and red force organization, capabilities, tactics, techniques, and procedures (TTPs) all doctrinally depicted, the only variables introduced are the TTPs and the capabilities of the system then undergoing test. The combat developer develops the system TTPs from the results of a series of force development tests and experimentations (FDTEs) performed in virtual simulation. The system

capabilities are the key characteristics required to perform the mission. Attack and reconnaissance helicopters capabilities are represented as measures of performance (MOPs) and modelled as parameters in the constructive simulation. Things like sensor detection ranges, target detection/engagement time requirements, weapons ranges and many others derived from the ORD or system specification become the key variables of the simulation. Let's say, for example, the objective is to learn how increased detection ranges influence the outcome of the battle. Thus, it can be determined whether or not a system contributes in a positive way to the force. As stated, however, these MOPs are derived from documents. It must be shown that a soldier can employ the equipment to achieve that same level of performance.

VIRTUAL SIMULATION

Vignettes are extracted from the battalion–size scenario. Troop–size units conduct their segment of the battle in the virtual simulation. They use fighting systems that have the function and fidelity of the system being tested. Semiautomatic forces (SAFOR) are programmed to represent the same organization and TTPs of the forces in the constructive simulation. The SAFOR play out their roles in the battle exactly as their counterparts had in the constructive simulation. The objective is to see how a tactically proficient soldier who is aware of the situation can influence the outcome of the battle. As these outcomes are assessed, some of the MOPs used in the constructive simulation may need to be modified. Using the same detection range example as above, the ORD specification value may indicate a level of performance greater or less than what a task–loaded soldier in the virtual simulation may be able to achieve.

Thus, the next step is to determine how many of the MOPs played in the constructive simulation must be adjusted as a result of the man–in–the–loop performance. The adjustments are made and the constructive simulation runs are repeated. The result is a clear understanding of what contribution the soldier who is operating the equipment can make to the battle.

Virtual simulation supports OT in other ways as well. The vast majority of test player training and test rehearsal can be done in virtual simulation. The TTPs for the OT, developed during FDTEs, are designed to support the OT process.

Finally, success is difficult to measure. The question becomes, "How did the soldier's actions effect the outcome of the battle?" The constructive/virtual tie–in provides the answer.

Performance can be measured objectively during FDTEs in virtual simulation with tools called mission success templates. Things like how many targets were detected, accuracy of target location, reconnaissance reports, etc., are objective assessments of performance. These assessments can be correlated with battlefield successes or failures during the constructive simulation runs. For example, a high percentage of target detections in virtual simulation may correlate with battlefield success in the constructive simulation.

Similarly, the minimum percentage of targets detected in virtual simulation can be used to define that percentage to be associated with success in constructive simulation. These percentages would then form the basis of the objective scoring templates used in the OT.

LIVE SIMULATION

The final piece of the OT process is fighting the actual equipment in operational vignettes. Verifying that the weapon system meets specification parameters comes under the purview of the developmental tester; however, the operational testers play a key role. Again, using the detection range example, the developmental testers check to see that the sensor system, unconstrained, can detect targets at the specified ranges on a variety of azimuths.

The operational testers then determine if the system can be employed operationally to meet the ORD and requirements of the COICs. Detection range and all of the other MOPs must be measured in operational conditions. For instance, how far can a task–loaded soldier—in smoke, fog, at night, on an operational mission—detect targets? Can the system do as well as we represented it in virtual simulation? Full blown, costly scenarios requiring large numbers of operating forces are not required. Vignettes, focusing on key weapon system characteristics, can be used to validate weapon system and soldier performance. This fully validated data can be fed back into the constructive simulation model and the overall effect on the battle can be assessed.

SUMMARY

The OT process must crosswalk the ORD, COICs, and COEAs in a logical, coherent process. Simulation plays a major part in that process. To simply measure how far away a target is detected is not enough. To take a single, company–size unit out to a desert range and measure how well it fights its battle is not enough. These assessments will not determine what the system brings to the combined arms battle. The melding of the constructive, virtual, and live simulation domains in a coherent, verified, validated battlefield environment is required for such determinations.

SIMULATION—A CORNERSTONE FOR BATTLE LABS

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The TRADOC battle labs have fostered an ever–increasing linkage to simulation, making simulation a cornerstone of battles. General Franks, Commander, TRADOC, directed that battle labs define capabilities, identify requirements, and determine priorities for the power projection army. . . . "I expect," he added, "each battle lab to be . . . a high–tech test bed with the ability to insert battlefield leverage technology horizontally across (the) force to increase combat power."

Some of the specific objectives of battle labs include link emerging technologies and warfighting ideas; increase use of simulation and use troop units for testing; and allow industry to develop a focus for developmental work and potential for prototyping. This philosophy and the resulting objectives set up a natural, if not imperative, linkage between simulation and the battle labs.

In 1992 the Army established battle labs on seven forts to represent the different tactical levels of warfare:

* Depth and Simultaneous Attack (Sill)
* Mounted Battle Space (Knox)
* Dismounted Battle Space (Benning)
* Early Entry, Lethality, and Survivability (Monroe)
* Battle Command and Control (Leavenworth and Gordon)
* Combat Service Support (Lee)

The aviation community is actively involved in all battle labs since aviation impacts on all battlefield dynamics and spans the entire spectrum of conflict with extremely diverse roles and missions.

The three types of simulation (live, constructive, and virtual) are tools available to the battle lab community to achieve the stated objectives. To pull these together, Army leaders have set forth a vision of how to use the totality of battlefield simulation technology and techniques.

The cornerstone of this vision is the Battlefield Distributed Simulation-Developmental (BDS–D) program. BDS–D is a long–term project. Its ultimate objective is to create and maintain a distributed, state–of–the–art network capability linking government, academic, and industrial sites into a simulation of the joint, combined arms battlefield. This desired end–state will build on the continued growth and development of the Advanced Research Projects Agency (ARPA)–sponsored Simulation Networking (SIMNET) technology. This technology is currently the basis for Army simulation test bed facilities at Fort Rucker and Fort Knox.

On a larger scale is the development of the Army Distributed Interactive Simulation (DIS) initiative. DIS provides the lead to coordinate and integrate tri–service, ARPA, and Defense Simulation and Modeling Office activities toward advancing the underlying open architecture, standards, databases, and general purpose designs needed to achieve seamless, synthetic environments.

The ARPA–established Defense Simulation Internet (DSI) will be the backbone for computer communication services such as DIS. A

wide array of simulation capabilities will be available to the developers, scientists, engineers, manufacturers, testers, analysts, and warfighters. Together they will address and solve the most pressing problems in the battle labs. The near–term efforts will use and expand current capabilities to support the battle labs.

Not all of the TRADOC battle labs currently have nodes, or direct access, to the DSI; however, coordination to install proper nodes has taken place and is ongoing. All of the battle labs must be "up" on the DSI. Then the experience gained from those activities will evolve into new methodologies. Continuous evaluation of concepts and requirements in a joint task force and combined arms battlefield context, with the warfighter in–the–loop, will take place.

Many activities are underway that coincide with General Franks' objectives for battle labs. They include:

* Projectile modeling. Modeling of projectiles and armor undoubtedly will contribute to future aircraft weapons platforms. The arrival of high–speed supercomputers with large memory has greatly enhanced our capabilities in modeling new armor concepts and advanced projectile technology. Recent large-scale simulations have provided insight into the potential benefits of advanced high–velocity projectiles.

* Atmospheric modeling. Atmospheric modeling activities will provide users a better understanding of the dynamics of wind; relative humidity; temperature; and turbulence fields over complex terrain, as well as weather predictions for target areas. Past Army tactical operations were highly vulnerable to changes in the atmosphere. Advanced computational techniques have produced transport and diffusion models of atmospheric aerosols; obscurants; nuclear, biological, and chemical agents; and dense gases over complex surfaces and terrain. The realism of warfighting exercises is increased by incorporating the effects of natural and battle–induced atmospheres in computer–generated results and visual simulations.

* Combined arms man–in–the–loop–simulation. An example of how battle labs can use technology is the Combined Arms Command and Control (CAC^2) Advanced Technical Demonstration (ATD). It will develop and demonstrate C^2 functionality and shared situational awareness for battalion and below to include aviation, infantry, fire support, and armor. Current plans call for simulating the C^2 functions of a battalion task force to evaluate various concepts of CAC^2 in BDS–D. The known simulation requirements include crewed aviation, armor, and combat vehicle systems. The virtual battlefield will be used to construct rapid prototypes of various concepts; to conduct tests/evaluations; and to redesign/evolve concepts based on knowledge gained from tests/experiments.

The CAC^2 ATD technical concept relies on BDS–D simulation as the primary means to establish functionality across combined arms elements. The CAC^2 concept uses the Combat Vehicle C^2 technology as a baseline. Through the use of digital technology; the Improved Data Modem (IDM) Operational Concept with the Automatic Target Hand–over System (ATHS); and the Intervehicular Information System (IVIS), the concept will expand to include aviation C^2 aircraft, such as the UH–60 Black Hawk and the OH–58D Kiowa Warrior.

These activities, and many more, are made available to the battle labs by the use of the connected simulations and simulators over the DSI net. The BDS–D program incorporates instrumented test data, leading to a wide range of accredited representations of warfighting environments. Key to this effort is the development of associated protocol data units, standards, databases, interface control documents, and evaluation methodologies needed to promote a commercially based investment strategy. Increasingly, simulation and modeling are advancing to the stage at which the Army can look forward to the completion of the BDS–D program. All elements of an armed conflict, from the individual soldier to the highest levels of command, will be able to interact either live, virtually, or constructively in a fully representative battlefield environment. This will, at last, provide a simulation that validly portrays the synergistic effects of humans and machines on the battlefield.

To maximize the benefits gained from simulations, the U.S. Army Aviation Center (USAAVNC) took steps to isolate those products most critical to aviation warfighting as a member of the combined arms team. The Aviation Battle Lab Campaign Plan (BLCP) is now under development. It will "identify and consolidate advanced warfighting simulations, exercises, and ATDs critical to aviation."

The BLCP will lay out responsibilities, timeliness, and priorities for those programs and projects that will most benefit the Aviation Branch. This plan will be a "living document" that will set the priorities for aggressive pursuit of the most critical actions. It will designate responsible USAAVNC offices for each subject. To get both unit and higher headquarter's input, the BLCP will be staffed through the Aviation and Troop Command; the Simulation, Training, and Instrumentation Command; the Program Executive Officer for Aviation; and the six battle labs. Using this methodology, the BLCP should focus Army aviation on those projects yielding the most benefit to the combined arms fight.

The Army's supporting capabilities, and those available to the TRADOC battle labs, are of the highest caliber. With time and resources, the battle labs will, in fact, realize General Franks' goal to become "high–tech test beds with the ability to insert battlefield leverage technology horizontally across (the) force to increase combat power."

AVIATION IN CONSTRUCTIVE SIMULATIONS

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A recent article in ***Army Times*** (Summer 1993), titled "Comanche Doesn't Fair Well in Simulation," caused enormous controversy throughout the aviation community. The result of such publicity is potentially devastating. To an acquisition manager, it could mean a funding delay. To a nonaviator, it means aviation is status quo. To a combat developer, it creates thoughts of disbelief.

What if an article written on the same subject were titled, "Comanche Doesn't Fair Well in Simulation Because It Wasn't Modeled Correctly?" Would these folks have the same thoughts? Probably not. The article in ***Army Times*** should have been so titled. The truth is that wasn't a Comanche in the simulation. The bottom line is that we, collectively, in the Aviation Branch, must ensure specific aircraft and aviation unit capabilities are portrayed correctly in constructive simulations.

If you subscribe to the theory anything short of war is a simulation, the three types of warfighting simulations are constructive, virtual, and live.

Constructive simulations are the computer–based, warfighting simulators, such as Corps Battle Simulation (CBS), Brigade and Battalion Battle Simulation (BBS), and JANUS. CBS trains corps and division staffs; BBS trains brigade and battalion staffs; and JANUS trains warfighters at the company and platoon level.

Virtual simulation uses man–in–the–loop cockpits and virtual battlefields, such as those found in the Aviation Test Bed (AVTB) at Fort Rucker.

Live simulations are those conducted at the National Training Center, other combat training centers, or at home station in the local training area.

The accurate portrayal of aviation in simulations concerns trainers, analysts, TRADOC System Managers (TSMs), and combat developers. Everyone who wears aviation brass and uses simulation as a training or experimental tool also should be concerned.

A concern among aviation commanders and users is that aviation doesn't always operate to its full potential in simulations. The full potential is not realized because it is difficult to achieve complete fidelity, or similarity of complex aircraft with the limited funds available.

We must understand we may never achieve complete fidelity of specific aircraft in simulations. Even all–out–war will not allow pure fidelity of every aircraft. There always are going to be aircraft that have a broken VHF radio, an inoperable 30mm cannon, or a faulty laser. These problems can cause an aircraft to operate below its true capability, i.e., fidelity.

Fidelity is how accurately the model simulates the behavior and dynamics of the actual battlefield [Chung, IDA DOC D–1369, 1992].

AVIATION IN PAST SIMULATIONS

A concern with constructive simulations in the past was with the combat arms branches. Whatever platform—tank or helicopter—brings the most "bullets" to the fight, likely shows the most value in the fight. Realistically, it doesn't matter how many "kills" a system gets. The true value of a system is found only when it correctly interacts as a lethal player as part of a combined arms force. The system must be able to shoot, move, communicate, and survive with its combined arms brothers.

Aviation has played in three different arenas in past simulations: training exercises, testing and experimentation, and a training and testing combination.

Training exercises, such as the Warfighter exercises conducted at corps and division level, use CBS to simulate war. Corps and division staffs conduct orders drills. The orders are executed in the simulation. These exercises are valuable in training corps and division staffs.

Testing and experimentation exercises are used to test everything from weapon systems to force structure. Mobile Strike Force (MSF), for example, is a test conducted with the annual Prairie Warrior training exercise at Fort Leavenworth, Kans. Prairie Warrior is a training exercise for Command and General Staff College students, MSF is a Battle Command Battle Lab (BCBL) test. In the MSF exercise, the design of a futuristic brigade (a mobile strike force), equipped with systems and technologies available in the year 2015, is studied. In addition, this test analyzes the effectiveness of the MSF against a futuristic opposing force (OPFOR). Finally, it tests the operational battle lab concept as an analytical tool for Louisiana Maneuvers (LAM) and warfighting issues.

Training and testing combinations occur during Warfighter exercises. These exercises are not always called training and testing exercises, but they do occur. For example, a recent Corps Warfighter exercise (December 1993) proved that testing and experiments are conducted during training exercises. In that exercise, a daylight "deep attack," AH-64 Apaches flew many kilometers behind the enemy forward line of own troops. This clearly is not aviation doctrine. A daylight "deep attack," threat dependent, is almost unheard of in current aviation tactics. However, this type of "experimentation" proves useful in determining aircraft survivability ratios during daylight hours.

The problem with training and testing exercises is that, if the players don't realize the exercise is for experimentation, we are likely to improperly portray aviation.

During the Warfighter exercise, none of the aviation players understood the exercise combined training and testing. It is possible none of the trainers knew either. Surprisingly, out of the 15 Apaches sent on the deep attack, only 4 were lost to enemy fire—not bad for a daylight deep attack. But do we really expect our combined arms brothers to believe these survivability ratios are typical for daylight deep attacks?

In other instances, aircraft are "said" to replicate a certain aircraft in a simulation; however, the model doesn't specifically portray that aircraft. For example, MSF is a battle lab test that used CBS as its tool. During MSF last year, an aircraft in the simulation was said to replicate an RAH–66 Comanche. No specific modeling was done for a Comanche. Therefore, the aircraft did not act like a Comanche in the simulation. The unfortunate result was a negative, inaccurate press release on the Comanche.

Captain Pat O'Neal, Aviation Battle Lab Support Team (ABLST), Fort Rucker, attended the MSF exercise last year. He said, "We're not quite there yet in simulating specific characteristics of specific aircraft: situational awareness, digitization, low observables, sensors, and communicating as a combined arms team."

This comment does not mean our "modelers" can't model specific characteristics of complex aircraft. However, improving models in constructive simulations takes time and money.

O'Neal says, "We're not using the right players to operate the simulations." If we use, say, a cook, instead of a qualified aviator to operate the player station during a test, we're not doing aviation justice. Sometimes, we don't have control over who is operating the console during these exercises, but often we do.

AVIATION IN PRESENT SIMULATIONS

Simulations must replicate the actual systems in the real force structure in a realistic environment as closely as possible. Otherwise, the testers won't believe the results, and the trainers won't use the simulation.

At issue is what specific capabilities of which specific aircraft should be modeled in simulations? It may be a question of priorities and dollars. Do we need to model sensors and a true stealth capability for the Comanche? If we are to test the capability of the system, I believe we must. If we conduct a training exercise and understand the aircraft in the simulation is not modeled to portray a Comanche, we must not call it a Comanche or think a Comanche was played.

AVIATION IN FUTURE SIMULATIONS

The future of Army aviation in simulations depends on our efforts to ensure aviation is portrayed correctly today. To do so, a team of experts at Fort Rucker—representatives from the Directorate of Training, Doctrine, and Simulation (DOTDS), ABLST, and the TSMs—met recently. They explored the portrayal of aviation in general and the modeling of specific aircraft in constructive simulation experiments and in training exercises.

As new systems are planned and developed, we must show their attributes in simulation. We must accurately simulate the systems, in all environments, before we build, buy, or fight.

Army aviation must be portrayed correctly in simulations to ensure a promising future. Finally, I hope these thoughts on aviation in constructive simulations have convinced you that the Aviation Branch will ensure specific aircraft and aviation in general are correctly portrayed in future constructive simulations.

AIRCRAFT SURVIVABILITY EQUIPMENT (ASE) IN SIMULATION

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Simulation of aircraft survivability equipment (ASE) and electronic combat (EC) is maturing on the modern battlefield. The electromagnetic spectrum should be treated as terrain for which battlefield commanders strive to gain and maintain control while, at the same time, deny its use by the enemy.

The Directorate of Training, Doctrine, and Simulation is making large strides in presenting a realistic synthetic environment to fight in the ASE/EC battle. There is one coherent strategy for simulating ASE and EC. The goal is to have all simulations parallel reality and, in the near future, link both reality and simulation in real–time battles.

The operational and tactical training received on ASE in the classroom or ASE Trainer–II (ASET–II) should be the same as in the flight simulators, in the aircraft with embedded ASET–III, at the National Training Center (NTC) against ASET–IV and, in the real world, against real threats.

Test data will confirm tactics, techniques, and procedures through the use of simulation models or through actual aircraft flight testing. As the test data does so, the simulations will be upgraded in all training devices to support the same training objectives. But where is aviation today?

The simulation capabilities of ASE and EC today are in varying stages. The ASET–II computer–based instruction has been fielded worldwide with software release 1.0. Is it perfect? No. However, with the constructive critiques from the user community, it is evolving. Software update release version 2.0 was fielded in March 1994 to answer the constructive critiques received thus far. Soft-

ware update release version 2.0 consists of four new disks to provide tracking of tutorial training, cures to bugs in the Game Management Software, new student data disks for tutorial training, and an update disk with the latest information. The U.S. Army now is in the forefront of the other services in providing individual ASE and threat training on such a large scale. (Seven hundred systems are fielded to Active and Reserve Components.)

The ASET–II combined with classroom instruction provides operators with the cognitive skills necessary to operate their ASE and apply it to the threats to their primary aircraft. This is the very basics of rote operator knowledge.

As operators master the skills learned in ASET–II, they apply their knowledge either in the flight simulation devices or in the actual aircraft with ASET–III. The flight simulators are in differing stages of maturity of ASE and EC simulation. The AH–64 Apache combat mission simulator (CMS), for example, has operational ASE controls and threat interaction models.

When a radar threat has established line–of–sight (LOS) with the aircraft, it will begin its own engagement sequence of search, acquisition, track, and launch. When interrupted by breaking LOS, or the use of jammers or decoys and maneuver, the threat must start his engagement cycle over. The threats may revert to their optical mode of engagement if ambient conditions permit or continue in their radar mode. The threats will "network" with other threats just as in reality.

This means, if one radar threat acquires the aircraft, it can pass information to other threats to aid in their acquisition. What this means to the ASE operators is that they must now apply their knowledge to disengage or destroy the threat. Now the operator must physically maneuver the aircraft instead of simply selecting the correct answer. The same is true for ASET–III.

ASET–III is an in-flight training device that represents an EC environment anywhere in the world the aircraft is deployed. A "phantom" range is programmed into the training device before flight. The locations of simulated threats are stored in the aircraft memory. If the aircraft flies within the lethal range and altitudes where the simulated threat can establish LOS, the cockpit indications begin realistic displays. If the correct tactic or countermeasure is employed, the threat will reset and start the engagement cycle over. The operator's actions are recorded for post mission analysis and debriefing. This is a reality today in the RC–12N aircraft platform and is projected for other airframes. Both ASET–III and the aircraft flight simulators allow crew training and application of rote understanding.

ASET–IV and multiaircraft simulations are the final stage of training and the development of small unit tactics. Both systems are force–on–force interactive trainers with kill or be killed capability. Each ASET–IV set consists of six modules: one command/control/communications (C^3), one SA–8, two ZSU–23–4s, and two SA–9 vehicles. In addition, SA–7/14 man–pads provide increased realism. Each module is equipped with MILES–AGES, which allows engagement scoring. The MILES–AGES on the aircraft read switch positions of the ASE systems and degrade the scoring effects when the ASE is operating. The combined effect causes sensor fusion between the threat and the aircraft systems to accurately determine, for both red and blue forces, the level of success of the engagement. The effects of countermeasures are depicted accurately; the ASET–IV modules video tape the engagements for post mission analysis and aircrew debriefings.

Although ASET–IV is a collective unit trainer, it performs more of an evaluation of the unit's capability to conduct operations in an EC battlefield environment. Eight ASET–IV sets will be fielded at the NTC, Joint Readiness Training Center, Combat Maneuver Training Center, I Corps, III Corps, and XVIII Airborne Corps beginning 1st Quarter of FY94. Interactive ASE and EC collective training simulations will include the Aviation Test Bed, Battle Distributive Simulation–Developmental, rotary–wing aircraft, and Aviation Combined Arms Tactical Trainer.

Now that ASE and EC simulation is becoming a reality, who can assist the commander in designing a training program that optimizes the use of new simulations? The ASE/EW officer is a new additional skill identifier (ASI) H3 trained subject matter expert at the aviation company level. These officers will manage ASE training programs, including training devices and the use of simulation. A robust ASE and EC training program will include: the use of ASET–II, III, IV, and Tactical Radar Threat Generator; formal threat and system update briefings; force–on–force training with organic ADA units; and the structured use of simulation against viable threat formations.

ASE and EC simulation is maturing and proceeding on course. Army aviation must win the EC battle to fight the physical battle. The use of simulation provides real solutions to training otherwise prohibitive in cost and training area availability.

THE WESTERN AATS FLIGHT SIMULATION DIVISION

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The Flight Simulation Division (FSD) at the Western Army National Guard (ARNG) Aviation Training Site (Western AATS), Marana, Ariz., provides training for ARNG and Active Component (AC) aviation units. The FSD uses the AH-IF Cobra Flight and Weapons Simulator (FWS). The FSD mission includes training in three major categories: regional support of AC and NG aviation units, internal FSD courses, and support for Western AATS AH-1 courses of instruction (COIs). This enables commanders to fulfill a wide variety of individual and unit training requirements. The FSD attains a substantial cost avoidance, greater than four to one, as compared to operating an aircraft.

To meet its mission, the FSD uses a 2B33-C version of the AH-IF simulator. This model uses computer-generated visual screens to provide a high level of realism in all phases of training. In the 2B33-C, both friendly and enemy vehicles will explode and burn if properly engaged by the aircraft weapon systems. Threat vehicles can shoot at, and kill, the aircraft if pilots expose themselves by using poor tactical flight techniques. The 2B33-C has a number of other capabilities the instructor can use, depending on the type of training and skill level of the pilots.

These capabilities are essential because commanders of AC and ARNG units must use simulator training to meet the challenge of maintaining combat readiness in an era of decreasing flying hours and training dollars.

Maintaining combat readiness can be achieved through regional support (RS) of attack helicopter units. The RS mission is, by far, the largest part of FSD training; it accounts for 8,732 of the 11,020 total training hours (TTHs) logged in Training Year 1992 (TY92). Of these RS hours, AC units flew 5,197 hours compared with 3,535 hours for ARNG that flew primarily during the 42 weekends the FSD was open in TY92.

Commanders place high priority on simulator training. For example, units with no mandatory FWS requirements flew 85 percent (7,422 TTHs) of the TY92 RS hours. Army Regulation 95-3 specifies minimum flying-hour requirements for units located within 200 miles of a compatible simulator. It also states units beyond 200 miles should set up simulator programs if it is cost effective and feasible. Eighteen units from as far away as Hawaii, Montana, and Arkansas have determined it is cost effective and feasible.

To achieve efficiency, unit instructor pilots (IPs) qualified as FWS instructor/operators (I/Os) normally conduct RS training. The FSD provides instructors for RS if a unit is short on I/Os because of other commitments. It is important for unit I/Os to conduct RS training because they know the unit's training needs, the proficiency level of the unit's aviators,and the training priorities of the commanders.

Regional support training includes all aspects of attack helicopter operations. Aviators can practice terrain flight navigation using a 1:50,000 scale map, in day or night conditions. Pilots use either night vision goggles (NVG) or fly unaided. The illumination can vary between broad daylight and a pitch-black, overcast night. Many units make up battle scenarios with map overlays depicting unit locations, boundary lines, air corridors, etc. The I/Os play the role of aeroscout aircraft, wingman, company commander, air defense artillery (ADA) units, artillery or air support, and combat support or combat service support elements as necessary. Aviators also practice Doppler navigation, aircraft survivability equipment procedures, evasive maneuvers, vehicle identification, spot reports, battle damage assessments, and many other tasks.

In addition, aerial gunnery is an important aspect of RS training accomplished as part of a scenario or as individual or crew training. Aviators can fire the weapon systems all day with no additional cost for ammunition. When conducting weapon systems training in a nontactical environment, the I/O can rearm and refuel the FWS in a matter of seconds. This saves a tremendous amount of time, fuel, and manpower compared with conducting aerial gunnery operations in the actual aircraft.

To further reduce costs, units also conduct instrument training and the

annual instrument flight evaluation during RS. The FWS is an excellent instrument trainer, allowing the aviator to perform every instrument task listed in the aircrew training manual. The I/O can set the ceiling and visibility anywhere between "zero zero" and a clear blue sky. When performed correctly, aviators can fly an instrument approach down to minimums, break out of the clouds, and see the approach lights guiding them in toward the runway.

Another valuable aspect of RS training is realized by aviators' practicing emergency procedures that can not be performed in the aircraft because of regulatory or safety considerations. Some examples are complete engine failure, engine fire, complete loss of the tail rotor gearbox, and a run-away gun.

The total cost avoidance for regional support training in TY92 was over $7 million. This does not include the substantial cost of ammunition because the number of rounds fired in the FWS is not tracked. Cost avoidance figures would add up quickly at $8,000 per TOW missile and $500 per 2.75-inch rocket.

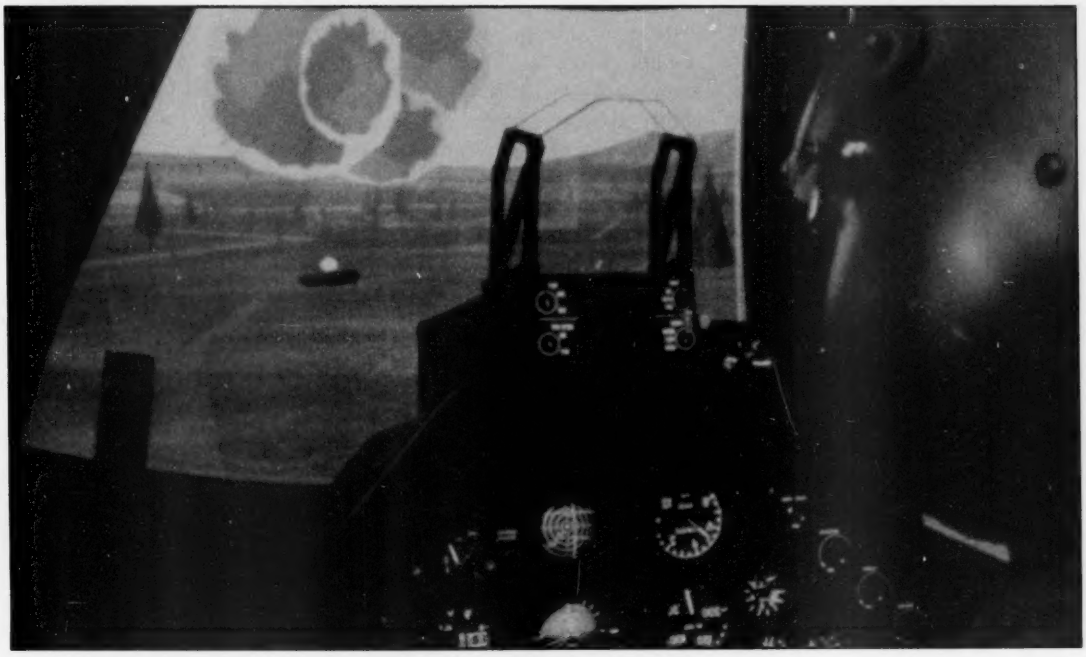
Another category of training consists of internal COIs taught entirely by FSD personnel. This training includes three courses: The Instructor/Operator Course (IOC), Instrument COIs Course, and the AH-IF Familiarization Course. These courses accounted for 1,307 TTHs and 616 hours of academic instruction while training 66 students. A brief description of these courses follows.

The IOC is a 5-day course that teaches how to operate the FWS. Consisting of 8 academic and 18 flight hours of instruction, this course teaches techniques for using the capabilities of the FWS to provide the highest level of training possible. Forty-eight students qualified as I/Os in TY92.

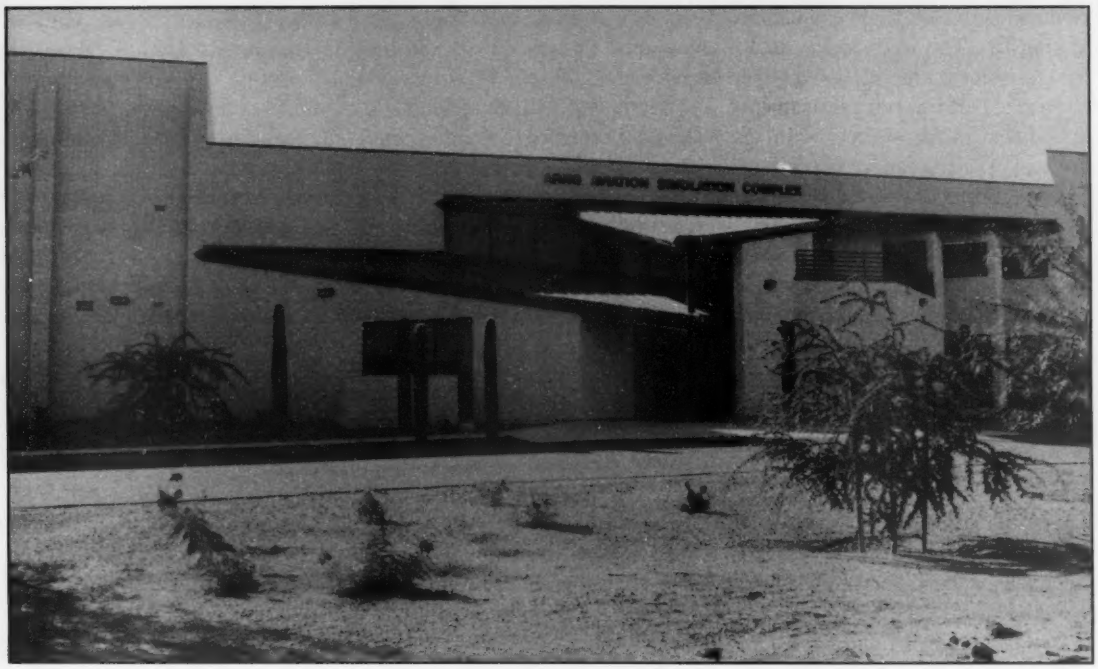
The instrument courses consist of 1-week and 2-week Instrument Refresher (IRF-1 and IRF-2), a 2-week Instrument Instructor Refresher (IIR), and a 3-week Instrument Qualification Course (IQC). The IRF courses are for aviators who have lost instrument currency or proficiency. The IRF-1 includes 20 hours of flight and 12 hours of academic instruction, while the IRF-2 has 40 flight and 25 academic hours. The instruction includes regulations, flight planning, flight and navigation procedures, and airspace designation and procedures.

The IIR teaches IPs how to conduct instrument instruction and administer the annual instrument evaluation. It consists of 40 hours of flight and 29 hours of academic training. Subjects are similar to the IRF courses with the addition of air traffic control (ATC) procedures and instrument-related methods of instruction (MOIs) and flight training techniques.

The IQC fulfills a need that arises when a former Army aviator who



This pilot is being engaged by an enemy tank as evidenced by the air burst and muzzle flash from the main gun. The pilot also hears the rounds going off through his headphones, and the helicopter shakes each time there is a near miss.



The new simulation complex, which will house an AH-64 Apache, a UH-60 Black Hawk, and one other simulation device, was completed in July 1993.

left the service before the requirement to have a standard instrument qualification joins a Guard unit to renew a flying career. The IQC provides sufficient flight and academic instruction to issue the required instrument qualification.

The Weapons Familiarization and Cockpit Familiarization courses are 3-day COIs designed for aviators awaiting a transition to the AH-1. These courses familiarize the aviator with all cockpit or weapons switchology and procedures. The Emergency Procedure Training course is also 3 days and covers instruction and practice in all emergency procedures associated with the AH-IF.

The third category of support is for Western AATS AH-1 COIs taught by the Flight Training Division (FTD) to support ARNG units throughout the country. The majority of these courses are aviator and instructor pilot qualification courses in the AH-1. The FWS is used to teach cockpit layout, engine runup through before landing checks, instrument flight tasks, aircraft survivability equipment procedures, Doppler navigation, and weapons system operation.

The Western AATS currently is in a transition from 100 percent AH-IS model training in TY92 to 70 percent AH-IF model training in TY94. This will increase FWS hours used to support Western AATS COIs because the AH-IFs flown in these courses are the same configuration as the simulator. Subsequently, FWS support will increase from 946 TTHs in TY92 to about 2,240 TTHs in TY94.

Looking towards the future, construction on a new simulator complex was completed in July 1993. This building is designed to house an AH-64 Apache Combat Mission Simulator (CMS), a UH-60 Black Hawk simulator, and a follow-on simulator device. The CMS is under contract with installation scheduled to begin in spring, 1994, and a training start date of January 1995. The time table for acquisition of the other devices is yet to be determined.

In summary, the FSD provides flight and academic training from initial aircraft qualification to advanced tactical scenarios for aviation units from throughout the United States. Training is provided to AC and ARNG aviation units during regional support, Western AATS AH-1 COIs, and FSD courses. A wide variety of training needs are fulfilled that save commanders valuable blade time on their aircraft while allowing them to maintain the level of combat readiness required by today's Total Army concept. The use of the FWS to conduct this training resulted in a total cost avoidance in TY92 of $8.8 million dollars.

ARMY NATIONAL GUARD ASSUMES THE OSA MISSION

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The end of Fiscal Year (FY) 1993 witnessed two significant decisions. These decisions will affect the way we manage Operational Support Airlift (OSA) assets within the Department of Defense (DOD) and the Army in the future.

Former Secretary of Defense Les Aspin, in his Roles and Missions Report, identified OSA within DOD as a specific mission to be reviewed. The U.S. Transportation Command, Scott Air Force Base, Ill., headed a series of joint service workgroups. Through these workgroups, a recommendation for coordinated scheduling among the services was submitted to the Joint Staff and approved. The coordinated scheduling option strikes a balance between the legitimate concerns of the services about centralized scheduling and the need to optimize the efficiency of OSA assets. Coordinated scheduling of all services' OSA aircraft is planned for implementation during 1994.

General Gordon R. Sullivan, Chief of Staff, U.S. Army (CSA), made the other significant decision: the Army National Guard (ARNG) would be the Army component to manage OSA. The remainder of this article addresses the key provisions of the CSA-approved concept, the implementation plan, and the organization.

CONCEPT

The ARNG set up centralized OSA scheduling in the continental United States (CONUS) in 1987. The Army did so in 1989. By 1 October 1992, the Army's system evolved into an Army Aviation command with the consolidated stationing of all Active Army (AA) OSA airplanes. Army Guard aircraft were stationed at the focal point for Guard support.

The CSA's decision to designate one component as the OSA manager for America's Army was the next step in a concerted effort by the Army to improve the efficiency and accessibility of Army and ARNG OSA airplanes.

APPROVED PLAN

The plan realigns CONUS-based AA and ARNG fixed-wing OSA assets–to include pilots and aircraft–into a single ARNG OSA command (OSAC). The new command comes directly under the Director, ARNG. The Director of the Army Staff (DAS) will provide executive oversight. The result will be a single, Army, OSA, fixed-wing manager using one scheduling standard. Wider and easier access to OSA passenger support airplanes will result once the transition to an Army National Guard OSAC is complete.

The transition from two segregated Army OSA scheduling and management systems to a single OSA manager will occur over the next 2 years. ARNG personnel will replace AA personnel in specified OSAC positions. The job status and duties of Department of the Army civilian (DAC) personnel will remain the same. A specified number of AA warrant officer (WO)-designated positions will remain in the new ARNG OSAC. The retention of AA WO positions in hub locations will provide a rotation base for outside Continental United States (OCONUS) assignments and a place to season recently qualified fixed-wing aviators. A joint effort between the Army OSAC and the ARNG OSA Transition Team will ensure transition remains transparent to customer organizations. This transition will be completed by 1 October 1995.

ORGANIZATION

A National Guard Bureau Field Operating Agency (FOA)(DA level) will be formed to mirror the Army's OSAC. The FOA will provide for

ARNG Active Guard and Reserve (AGR) personnel (Title 10), AA WOs, and DACs (Title 5). ARNG organizations of the OSAC are formed under a separate table of distribution and allowances (TDA) that provides for Title 32 AGR and M-Day personnel. Both organizations will become elements of a consolidated OSA mobilization TDA.

The consolidated OSA organization does not increase cost to the Army or the ARNG. It merely identifies existing resources used to support the two separate OSA programs. It merges them into a single resource management program. Operational emergencies will occur, but the primary benefit will be more efficient and better operational support to CONUS customer organizations.

COMMAND ASSETS

All AA OSAC and ARNG OSA fixed-wing assets will be organic to the new ARNG OSAC. The new ARNG OSAC will consist of 126 fixed-wing aircraft. The Lear jet and three Gulfstream jets based at Andrews Air Force Base, Md., will be part of the new OSAC. However, the Jet Priority Air Transport detachment will remain staffed entirely by AA personnel. The 27 UH-1 Iroquois and 5 UH-60 Black Hawk helicopters at Fort Belvoir, Va., will remain assigned to the Military District of Washington. They will provide rotary-wing priority air transport in the National Capital Region. The approved concept places all CONUS, OSA, fixed-wing aircraft under one command, scheduling authority, and standard.

Wartime requirements determined the OSA fixed-wing requirements identified in the previous paragraph. The 1990 Combined Arms Center Wartime Requirements Study set wartime fixed-wing requirements at 180 aircraft (4 jets, 161 utility, and 15 cargo). Because of the change to a base force strategy and the bottom-up review, the Training and Doctrine Command, Fort Monroe, Va., has contracted for a new wartime requirements study. Military Professional Resources, Incorporated, the new Virginia-based contractor, should complete the study during FY94. New fixed-wing aircraft will be procured or old ones will be replaced according to the Army's Fixed Wing Investment Strategy.

SMARTER USE OF THE RESERVES

The centerpiece of the CSA-approved plan is smarter use of Army and ARNG capabilities. Accessibility to Guard OSA airplanes procured by Congress is obtained through an ARNG scheduling authority. Creating ARNG CONUS State flight detachments from State Area Command assets will make it economically feasible to support outlying Army, ARNG, and USAR organizations and will complement the present hub system. Finally, additional ARNG OSA aircrews will provide an affordable means of obtaining peacetime efficiencies and a CONUS OSA wartime surge capability. The use of additional OSA aircrews, two pilots per aircrew seat, parallels an Aviation Restructuring Initiative. The peacetime OSA fixed-wing operational tempo (OPTEMPO) of 50 to 90 hours per month puts a high demand on existing aircrews. This is especially true as aviation-rated staff officers are presently counted against airplane seats. The additional OSA aircrews are ARNG M-Day personnel. This use of M-Day aircrews will enable the ARNG OSAC to remain affordable but ensure aircrew availability.

Now enough ARNG fixed-wing aircrews will be available to volunteer for, or to be called to, active duty to support a number of commitments by the Army. In peacetime, the M-Day aviators will sustain their flight proficiency by executing OSA missions. OSA peacetime mission performance directly equates to OSA aircrew mission training; therefore, additional flight time to sustain M-Day aircrew proficiency will be minimal. During surge requirements, additional M-Day aircrews will provide for increased use of OSA fixed-wing assets commensurate with the full capability of modern turbine airplanes. Yet, a safe, sustainable aircrew OPTEMPO may be retained through access to additional aircrews.

THE FUTURE

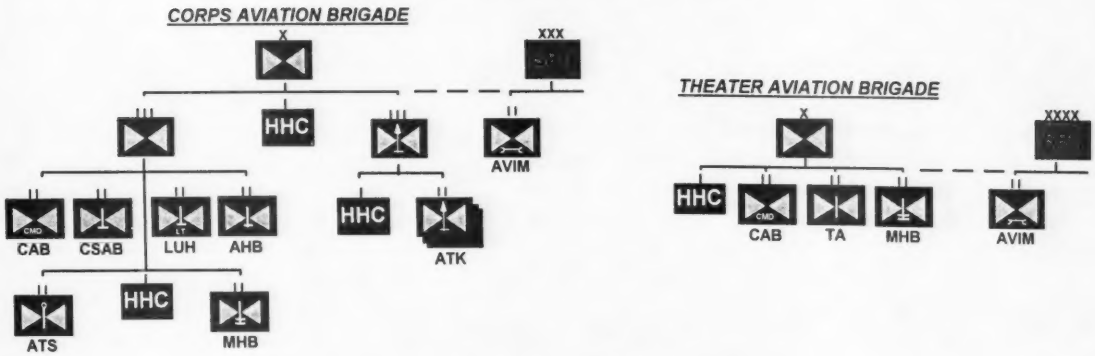
For America's Army, the ARNG OSAC will increase access to, and the efficient use of, all CONUS, OSA, fixed-wing aircraft. This will be done through one scheduling system during both peacetime and contingency operations. In today's climate of joint service cooperation and coordinated scheduling, now there will be one focal point to coordinate cross-service OSA support with the Air Force, Navy, and Marines. In the organization, there will be one OSA management, standardization, and safety system.

SUMMARY

The DAS remains the Executive Agent for OSA; the ARNG OSAC becomes the Army's OSA manager and scheduling authority; hubs remain where they are; and an ARNG OSA State flight detachment remains in each CONUS state but is scheduled to support all components of the Army. The CSA-approved concept streamlines relationships, eliminates duplication, and ensures resources for national defense are maximized. Once the transition is completed, this new ARNG OSAC should provide the greatest military payoff for each dollar of resource currently allocated to OSA.

AVIATION RESTRUCTURE INITIATIVE—

Corps Aviation Brigade
Theater Aviation



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This article is the third in a series on the Aviation Restructure Initiative (ARI). The first article, "Aviation Restructure Initiative—The Way to the Future," by Lieutenant Colonel Rick Scales, in the ***Aviation Digest*** September/October 1993 issue, discussed the methodology of the ARI development and impacts on the total aviation force structure. The second article, "ARI—The Divisional Aviation Brigade," by Major(P) Jerry K. Hill, in the November/December 1993 issue, focused on the impacts and changes to the divisional aviation brigade.

This article concentrates on the impacts and changes to corps aviation brigade units, and theater aviation units. Table of organization and equipment requirements establish the personnel and aircraft numbers. They do not necessarily reflect modified table of organization and equipment (MTOE) numbers or current unit authorizations. Besides modernization level differences, fielded corps and theater units may not have the full compliment of subordinate units.

The goals of ARI to fix Army of Excellence (AOE) deficiencies, reduce logistics requirements, drive down costs, and retire old airframes remain the focus of aviation structure development. In light of these tenets, we established new structure designs while remaining within mandated personnel strength limitations and aircraft modernization plans.

To achieve these goals, we evaluated each aviation unit and subunit to determine its specific contributions to warfighting and its logistics impacts. In addition, we analyzed every element within each unit to determine the changes needed at the platoon and company level.

The first article outlined the changes built into the ARI designs. These include: consolidating low-density aircraft into a single unit in the brigade; creating homogeneous units, units with one type aircraft; replacing nonmodernized UH–1 Iroquois and OH–58 Kiowa A/C aircraft with modernized aircraft; increasing the number of logistics personnel by resourcing units at 100 percent of the manpower allocation requirements criteria (MARC); adding an assistant crewchief for UH–60 Black Hawk utility aircraft; and increasing headquarters personnel requirements to sustain 24–hour operations and enhance command and control (C^2).

This article outlines the specific changes and resulting unit designs

for corps and echelon above corps units. The changes focus on preserving and enhancing combat effectiveness while eliminating unnecessary overhead and structure. The ARI accomplishes this task while remaining within the guidelines of the Total Army Analysis 2001. This biannual process evaluates the Total Army force and determines the proper allocation of forces to accomplish the mission.

An interim and objective ARI organizational design exists for attack battalions and cavalry squadrons. Introduction of the RAH–66 Comanche is the primary difference between the objective and interim structure designs.

CORPS AVIATION BRIGADE

The corps aviation brigade includes elements of attack, C^2, assault, and medium–lift battalions. Fielded corps aviation brigades uniquely deviate from this base design, which is tailored to mission requirements. Fielded units may consist of the following:

- Corps aviation brigade headquarters
- Attack regiment headquarters
- Aviation group headquarters
- Command aviation battalion (CAB)
- Combat support aviation battalion (CSAB)
- Corps assault helicopter battalion (CAHB)
- Medium helicopter battalion (MHB)
- Light utility helicopter (LUH) battalion
- Attack helicopter battalion

Corps Aviation Brigade Headquarters. The ARI significantly increases the diversity of soldiers within the brigade staff sections. This infusion of soldiers into the headquarters company greatly improves the brigade's ability to conduct 24–hour operations, establishes divisional liaison, manages personnel and logistics resources, and establishes superior Army Airspace Command and Control (A^2C^2). The corps aviation brigade increase in personnel from 81 to 97 includes seven officers, four warrant officers, and five enlisted soldiers. Specific additions, such as a liaison team, an assistant S2, an assistant chemical officer, a tactical operations officer, and an air defense section significantly enhance the warfighting effort. In addition, this increase in personnel improves the 24–hour operations and knowledge base of the brigade headquarters. Improved C^2 and efficiency highlight the benefit of adding an executive officer, a military personnel technician, and a unit maintenance technician in the company headquarters. As a result of ARI, an austere aviation brigade transforms to a fightable, sustainable unit. Figure 1 shows the personnel added to the corps aviation brigade headquarters.

Attack Regiment Headquarters. As a result of ARI, the attack regiment headquarters increases in personnel from 66 to 85. This increase includes five officers, five warrant officers, and nine enlisted soldiers. The attack aviation regiment headquarters improvements mirror those

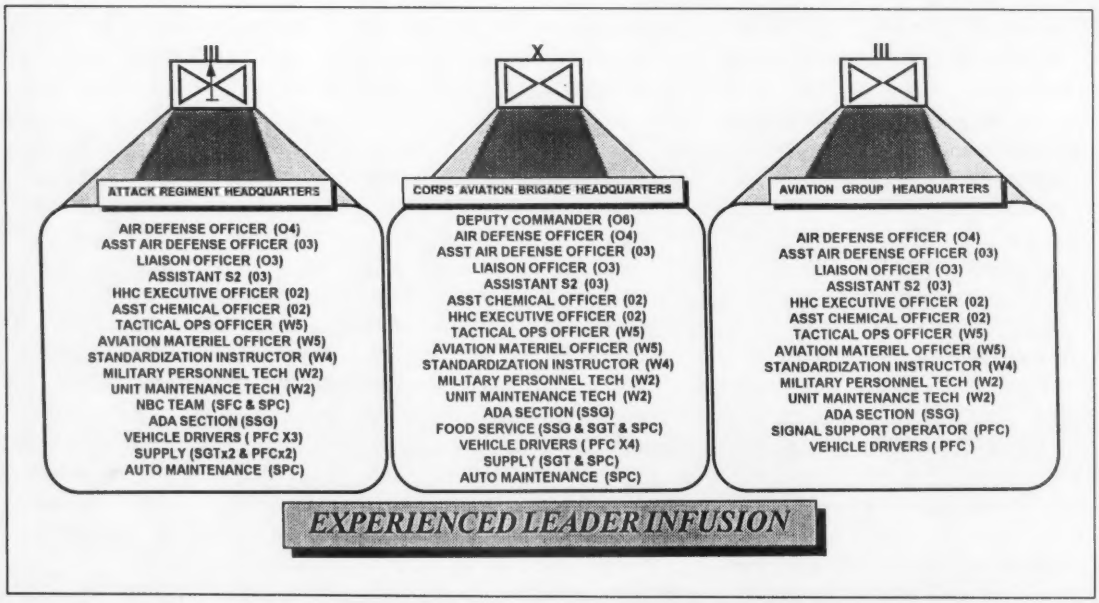


Figure 1. Attack Regiment, Corps Aviation Brigade, Aviation Group

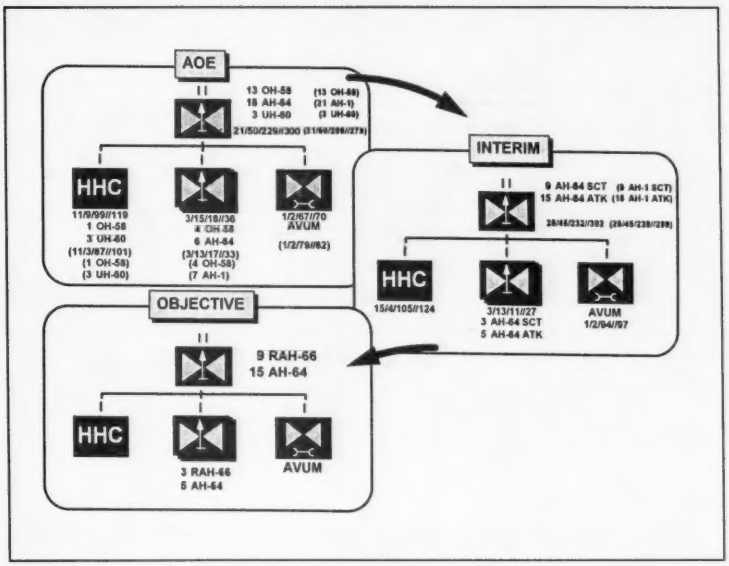


Figure 2. Attack Battalion

of the corps aviation brigade headquarters with exception of the deputy commander position. The headquarters possesses more depth and experience to fight the deep battle more effectively. The chief warrant officer 5s assigned to the S3 and S4 sections typify design changes to improve experience levels and personnel density. Figure 1 shows the personnel additions to the attack regiment headquarters.

Aviation Group Headquarters. The aviation group headquarters increases in personnel from 66 to 78. The additions to this company follow the same convention shown previously in other companies. Figure 1 shows the 12 additional authorizations for the aviation group headquarters.

In essence, the ARI design changes at all headquarters levels greatly enhance their ability to maintain 24–hour operations, logistics operations, personnel activities, and maintenance production without augmentation from subordinate units. Figure 1 shows the 12 personnel authorizations and additions to the aviation group headquarters.

Attack Battalion. The current attack battalion consists of a headquarters and headquarters company (HHC) (three UH–60s and one OH–58A/C), three line companies (four OH–58A/Cs and six AH–64 Apaches each), and an aviation unit maintenance (AVUM) company. The total battalion personnel strength is 300. New designs eliminate the utility aircraft and transfer it to the CAB or CSAB. This initiative improves maintenance management, reduces logistics requirements, and reduces the number of personnel requirements.

The aeroscout mission aircraft (OH–58A/C) is incompatible with the AH–64 attack aircraft and contributes minimally to warfighting. As an interim solution, the AH–64 replaces the OH–58A/C and performs the scout mission. The ARI attack battalion (figure 2) has three line companies of three AH–64 scout and five AH–64 attack aircraft each, for a total of 24 AH–64s and 302 personnel. The objective force replaces the AH–64 scout with the RAH–66 Comanche.

Command Aviation Battalion. The current CAB consists of an HHC (5 fixed wing), two command aviation companies (15 UH–1s/UH–60s each), a target acquisition reconnaissance company (TARC) (15 OH–58s) and an AVUM. The battalion personnel authorization totals 320. The interim design modernizes the utility aircraft to the UH–60 and separates the two command companies into three companies of eight aircraft each. The objective design modernizes the TARC aircraft to RAH–66. Both retain the fixed wing in the headquarters company. In addition, the unit personnel strengths of the interim and objective designs

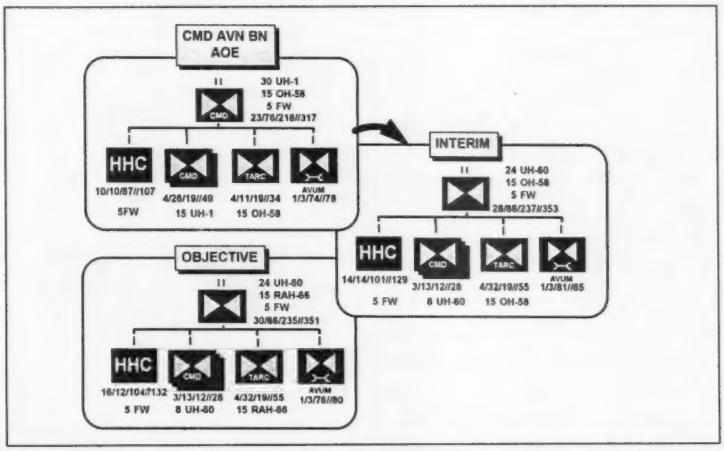


Figure 3. Command Aviation Battalion

increase to 353 and 351, respectively. Figure 3 depicts the CAB transition.

Combat Support Aviation Battalion. The CSAB is a derivative of the assault helicopter battalion. A new organization, it consists of an HHC, four UH–60 companies (8 UH–60s each), and an AVUM company. The unit personnel total is 345. Although the total personnel authorizations only show a moderate increase of seven soldiers over the current assault battalion, the effect is apparent when considering the reduction in total airframes from 45 to 30. Hence, the ratio of personnel to aircraft dramatically increases within the battalion (figure 4).

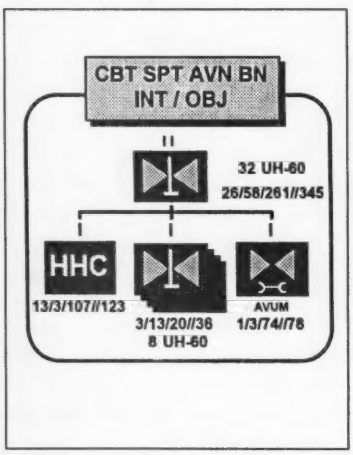


Figure 4. Combat Support Aviation Battalion

Assault Battalion. The current assault battalion consists of an HHC, three assault companies (15 UH–60s each), and an AVUM company. The unit total is 338 personnel. The corps assault battalion reduces to two assault companies, yet retains a total personnel authorization of 318 as a result of resourcing at 100 percent of the MARC and the addition of an assistant crewchief for each UH–60 aircraft. Figure 5 depicts the assault battalion transition.

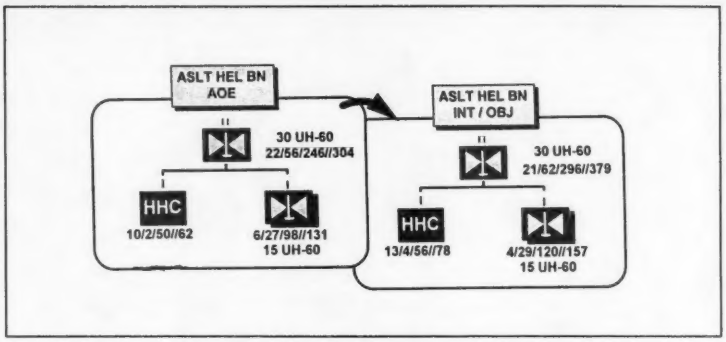


Figure 5. Assault Helicopter Battalion

Medium Helicopter Battalion. As many as four CH–47 Chinook companies (16 CH–47s each) and an HHC may be assigned to the MHB, the largest of all helicopter battalions. Although the aircraft density and company structures remain unchanged, the personnel total per company increases from 201 to 239. The HHC also increases from 59 to 79 personnel. Figure 6 depicts the corps and theater CH–47 units.

Light Utility Helicopter Battalion. The LUH battalion (figure 7) supplements the corps utility capability to perform those utility helicopter missions that do not require the UH–60. The unit mission is to provide light utility aircraft for critical leader and staff transport and air movement of personnel and equipment in support of corps operations. Currently, the aviation force of UH–1s and OH–58A/Cs perform the LUH mission. The Army has not determined the LUH aircraft for the objective design. The LUH battalion consists of an HHC and four companies of eight LUH aircraft. This design enables the greatest flexibility for the corps commander to allocate this resource by company slices.

THEATER AVIATION BRIGADE

The theater aviation brigade unites many widely dispersed assets into a standardized structure. The brigade

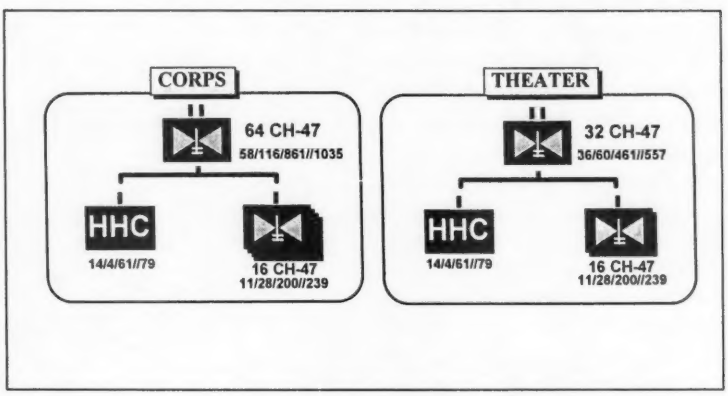


Figure 6. Medium Helicopter Battalion

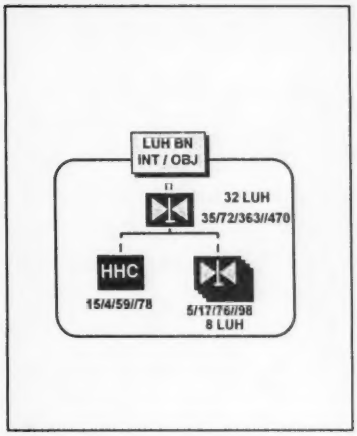


Figure 7. Light Utility Helicopter Battalion

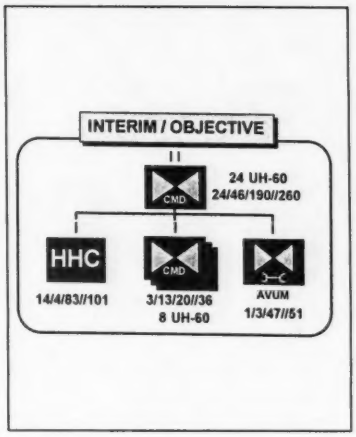


Figure 8. Command Aviation Battalion, Theater

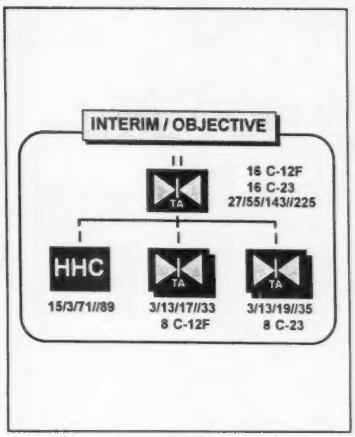


Figure 9. Theater Aviation Battalion

consists of an HHC, a CAB, theater aviation battalion (fixed wing), and a theater MHB.

Theater Aviation Brigade Headquarters. The HHC consists of 22 officers, 6 warrant officers, and 57 enlisted soldiers for a total of 84. This unit's structure mirrors the attack regiment headquarters company; however, it has a three–person A^2C^2 element and a three–person food service section. ARI establishes this unit to manage consolidated theater resources more effectively.

Command Aviation Battalion. The ARI consolidates the theater LUHs into one CAB (figure 8). The three companies of the battalion maintain the eight aircraft configuration found at both the division and corps level for a total of 24 UH–60 aircraft.

Theater Aviation Battalion. The ARI also consolidates fixed–wing assets into a standardized, single–source battalion. The battalion has two companies of eight C–12 Hurons each, and two companies of eight C–23 Shorts Sherpas each, and an HHC. The unit total is 225 personnel. Figure 9 represents this new concept.

Medium–Lift Helicopter Battalion. The theater medium–lift helicopter battalion restructure follows the same structure initiatives described for the corps medium–lift helicopter battalion. The theater MHB, however, has only two medium–lift companies. Figure 6 shows the medium–lift units.

CONVERSION SCHEDULE

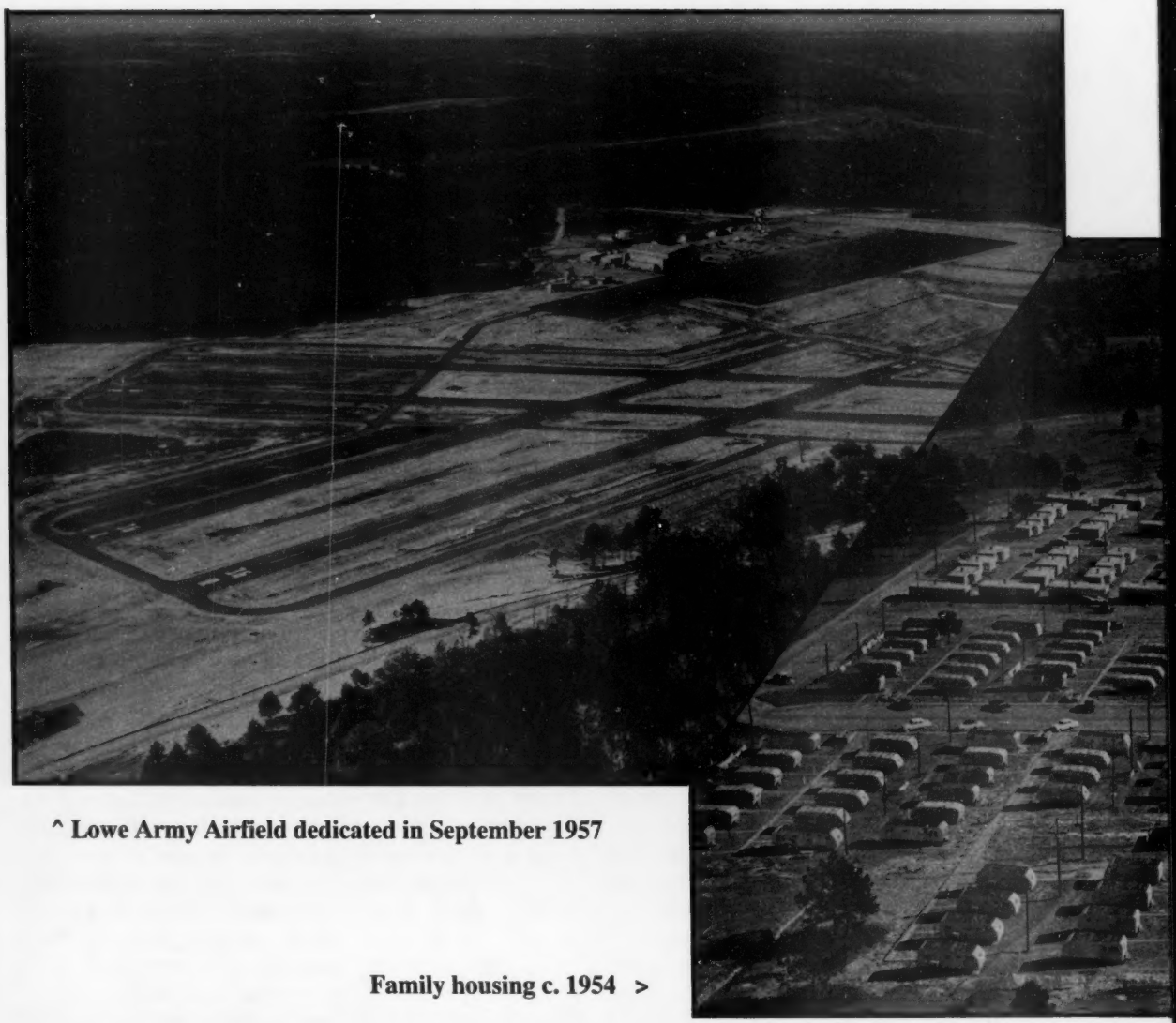
Since ARI approval on 3 February 1993, several units have begun conversion to new structure configurations. All units have tentative conversion and deactivation dates. The majority of the aviation force will convert to the ARI design between fiscal year (FY) 1995 and FY98 with several reserve component units scheduled to complete conversion by FY 2000.

SUMMARY

In times of limited resources and budget constraints, leaders must apply innovative measures to accomplish mission requirements. The austere aviation force in the AOE created an imbalance in the delicate relationship between the requirement for a fightable, sustainable force and available resources. Eliminating more than 1,500 aircraft and consolidating scarce resources, the ARI corrects the imbalance while it increases operational readiness, improves responsiveness to warfighting, decreases logistics demands, and uses available assets more efficiently. As a result of ARI, the aviation force stands prepared for the future—a standardized force structure, ready to continue modernization into the 21st century. ***Above The Best!***

Forty years ago —the story of the move and establishment of the Aviation Training Center

This study of Army Aviation was excerpted from a longer work in progress. Additional articles on the history of Army Aviation will appear in future issues. An account of the selection of Camp Rucker, Ala., as the new home for the Army Aviation school, was published in the January/February 1994 issue.



^ Lowe Army Airfield dedicated in September 1957

Family housing c. 1954 >

The Establishment of Army Aviation at Fort Rucker

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Following the official announcement, on 20 July 1954, of the decision to move the Aviation School to Rucker, little time was lost in getting the move underway.

A Department of the Army (DA) letter of 23 July instructed the school commandant, Brigadier General (BG) Carl I. Hutton to work with the commanding generals of the Third and Fourth Armies to prepare plans for moving the Aviation School as well as other aviation activities from Fort Sill to Camp Rucker. Hutton was to submit the plans to DA for approval no later than 1 September 1954.[1] On 29 July 1954, the DA officially rescinded an earlier order for Camp Rucker to be inactivated.[2] It remained a temporary post, however, until October 1956.

Upon BG Hutton's becoming commandant of the Aviation School in July 1954, Colonel (COL) Jules E. Gonseth, Jr., was named assistant commandant. The new chief of staff was Lieutenant Colonel (LTC) Carlyle W. Arey, and the deputy assistant commandant was LTC C. W. Matheny, Jr. The long-time flight surgeon of the Department of Air Training, LTC Rollie M. Harrison, remained at Fort Sill, and COL William H. Byrne became the first flight/station surgeon at Camp Rucker.[3]

On a trip to Camp Rucker in early August, BG Hutton stopped by Third Army headquarters in Atlanta, Ga., to work out details of the command with the Third Army commander, LTG Alexander R. Bolling. Camp Rucker was to be a class I installation under the jurisdiction of the commanding general of the Third Army. The initial table of distribution and allowances for the school and post was set at 905 spaces. Bolling agreed to Camp Rucker's having a general staff and general court-martial jurisdiction and recommended the school and post headquarters be combined.[4]

The plan for transferring the school to Alabama called for a phased move so as to cause a minimum amount of disruption to classes. New classes beginning after September 1954 were to begin at Camp Rucker. Those beginning before that time were to remain at Fort Sill until they ended. On 20 August, the chief of staff, LTC Arey, moved to Camp Rucker with an advance party to organize support operations to prepare for the reopening of the post. At the end of August, BG Hutton left his assistant

commandant, COL Gonseth, in charge of the Aviation School at Fort Sill and moved to Rucker, where he officially reopened the post and assumed command on 1 September.[5]

On 1 October the first 16 of the 250 helicopters used for rotary-wing training arrived at Camp Rucker. Shortly afterwards, L-19 Birddogs and other fixed-wing aircraft were flown in–mostly by former students upon graduating from classes at Fort Sill. Both fixed- and rotary-wing classes began at Rucker during the latter part of October.[6]

The Army Aviation School was discontinued at Fort Sill and established officially at Camp Rucker effective 1 November 1954.[7] In early November, COL Gonseth moved to Camp Rucker, leaving LTC Charles Ernest, with the title of executive officer, in command of the rear element at Fort Sill.[8]

By Christmas 1954, seven classes were being taught on regular schedule at Rucker, and two fixed-wing aviation classes were within a month of graduating. The last fixed-wing class graduated at Fort Sill on 1 December, and the last maintenance class, on 17 December. By end of 1954, fewer than 100 Army Aviation School personnel remained at Fort Sill, with more leaving each day. The last helicopter class graduated on 26 February 1955, at which time the transfer of the school was completed.[9]

BG Hutton and his staff made several organizational changes as they established the Army Aviation School at Camp Rucker. At Fort Sill the school had consisted of four departments–the Departments of Flight, Aviation Maintenance, Tactics and General Subjects, and Publications. There were, in addition, five staff sections--Secretary, Operations, Materiel and Services, Medical, and Safety.[10]

When the school moved to Rucker, the Department of Flight became the Department of Fixed-Wing Training, and a new Department of Rotary-Wing Training was created. The Department of Aviation Maintenance and the Department of Tactics and General Subjects remained unchanged during the move to Rucker.

In September 1955, however, general subjects were removed from the Department of Tactics and jointed with aviation maintenance to form the Department of Academics, which was renamed the Department of Maintenance two years later.

The Fort Sill Department of Publications became the Department of Publications and Nonresident Instruction after the move. The Operations Staff Section became the Airfield Operations Unit. The Office of the Director of Instruction was established at the time of the move; the director of instruction was the principal assistant to the assistant commandant and was directly responsible for academic operational matters and instructor training.

Other Aviation Activities Follow the School

Aviation activities that moved to Camp Rucker along with the Aviation School included the following: the Army Aviation Service Test Division; the U.S. Army Board for Aviation Accident Research; the Combat Developments Office; and Spartan Aircraft Company, the civilian contractor for aviation maintenance.

The Army Aviation Service Test Division began as the Army Aviation Division of the Army Field Forces Board No. 1, at Fort Bragg, N.C., in 1945. In June 1954, Board No. 1, including the Aviation Test Division, moved to Fort Sill.

In September and October, the Aviation Test Division, consisting of between 20 and 30 military personnel, followed the Aviation School to Camp Rucker. At Rucker, the Aviation Test Division was placed under administrative control of a test board at Fort Bragg.

Early in 1955, however, because of the tremendous amount of testing resulting from the rapid growth of Army Aviation, the new Board No. 6 was established at Rucker. This board was totally separate from the Fort Bragg board. The test board at Rucker was redesignated the U.S. Army Aviation Board in January 1957.[11]

The Aircraft Accident Review Board, consisting of one officer and one enlisted man, was redesignated the U.S. Army Board for Aviation Accident Research before the move from Fort Sill. At Camp Rucker, the board was established as a class II activity with two officers, two civilians, and one enlisted man. Its mission was to conduct research and determine what improvements could be made in aviation materiel, operations, supervision, personnel, and training.

In July 1957, the board was redesignated the U.S. Army Board for Aviation Accident Research.[12] In 1978, it was renamed the U.S. Army Safety Center, responsible for both aviation and ground safety.

The Combat Developments Office, with a staff of four officers, five enlisted men, and two civilians, moved from Camp Sill to Camp Rucker in October 1954. The office was established at Rucker as a class II activity, to develop, revise, and evaluate doctrine, tactics, techniques, organization, and equipment for Army Aviation.[13] The Combat Developments Office operated under the auspices of the Office of the Chief of Army Field Forces until early 1955, when it came under the new Continental Army Command.[14]

When the school moved to Camp Rucker, Spartan Aircraft Company had the contract to perform organizational and field maintenance on both fixed- and rotary-wing aircraft for the Army Aviation School. To provide continuous maintenance during the phased move of the school, Spartan split its work force between Sill and Rucker. When the move was complete, about 300 Spartan employees had moved from Oklahoma to Alabama; about 500 more employees were hired and trained in Alabama.

For the first few months at Rucker, aircraft maintenance was seriously hampered by inadequate and insufficient facilities and equipment. Effective maintenance performance was achieved, however, by March 1955.

Spartan continued to be awarded the school maintenance contract until July 1955. At that time, Aeronca Aircraft replaced Spartan as the maintenance contractor. As would be the case during subsequent changeovers, most employees of the old contractor were hired by the new contractor. The vice-president

of Aeronca in charge of Fort Rucker operations was BG (Ret.) W.W. Ford, the first director of Army Aviation training.[15]

Establishing an Aviation Training Center at Camp Rucker

BG Hutton and his staff encountered numerous problems in transforming a temporary infantry training camp into an aviation training center. In August of 1954, Ozark Army Airfield consisted only of "runways and taxiways, two dilapidated buildings, and one hanger with both ends missing." On one occasion, when a late returning pilot had to land after darkness, the chief of staff of the post and some other staff members provided the necessary illumination by mixing gasoline and sand in number 10 cans and placing them along the runway.[16]

The cantonment area of the post consisted of more than 1,500 temporary wooden buildings but no permanent buildings except a sewage disposal plant and a few brick pumping stations. According to BG Hutton, only three living quarters were marginally adequate: one on Division Road, into which the assistant commandant moved; one at Lake Tholocco, into which the post engineer moved; and the general's quarters (later 43 Red Cloud Road). Hutton described the general's quarters, which he and his family occupied, as a "jerry-built affair ... on Rattlesnake Ridge." In addition, there was a Public Housing Authority project on Ozark Road consisting of over 300 "substandard houses and mobile homes."[17]

The training facilities were no better than the quarters. With only slight exaggeration, BG Hutton wrote: "As far as establishing the Army Aviation School was concerned, there were no hardstands for parking aircraft, hangers for maintenance, school headquarters buildings, academic classrooms, laboratory and shop type classrooms, fixed-wing stage fields, fixed-wing stripes [sic], rotary-wing stage fields, rotary-wing autorotation areas, navigational aids, Link trainer facilities, flight operations buildings, crash fire facilities, runway lights, stage houses, [or] library and museum buildings."[18]

During the early months at Rucker, the school operated under three additional constraints as follows:

. First. Instructions from Washington prohibited any modifications to the post that would interfere with its mobilization mission. This mission called for the occupation of the camp by a full division of troops. Thus, the school was restricted in the use, modification, and removal of existing temporary buildings

. Second. No permanent construction was authorized as long as Camp Rucker was classed as a temporary post. Therefore, long-term planning and construction projects, except those of immediate operational necessity, were delayed.

. Third. The 47th Division, which had occupied the post during the Korean conflict, had spent a full year, from mid-1953 to mid-1954, "stripping the post of all property which was at all usable anywhere else."[19]

Notwithstanding the many adversities, Hutton and his staff made rapid progress in organizing the school and post. Although extensive remodeling was required, the World War II era post headquarters building became the school headquarters.

The school received a grant from post exchange funds to remodel another building for the post exchange. A total of $1.2 million of maintenance and operation money had been allocated for the move from Fort Sill to Camp Rucker. The school used a considerable portion of these funds to convert existing buildings for student briefing rooms, flight operations, the Aviation Board office, and an office for the maintenance contractor. Other priority projects included the improvement of runways and hangers and the construction of hardstands and a fire-crash-rescue building.

Construction began on what came to be Knox, Ech, Hatch, and Hooper stage fields and on fixed-wing strips on the western part of the reservation. Also, over 200 landing sites outside the reservation had been selected and leased by 1956.[20]

Very early during the move of the school to Rucker, General Hutton and his staff had to decide how to separate fixed-wing from rotary-wing training activities. They decided to use Claybank Creek and Lake Tholocco to delineate the boundary between airplanes to the west and helicopters to the east. Ozark Airfield, located near Claybank Creek, was the primary fixed-wing training site, but was also used for some helicopter training until other facilities were prepared.

Early plans called for the construction of auxiliary fields for both fixed- and rotary-wing training. The site selected for the fixed-wing auxiliary field required large amounts of earth to be moved in the construction process.[21] The construction of Auxiliary Field No. 1 on this site was one of the earliest major projects at Rucker. In September 1957, the field was dedicated as Lowe Army Airfield, in honor of Professor Thaddeus S.C. Lowe, who organized the Balloon Corps of the Army of the Potomac during the Civil War.[22]

Locating the rotary-wing auxiliary field required more time. According to a contracted study, the recommended sites were within a range impact area in the southeastern portion of the reservation.[23] Facilities could not be constructed in this area, however, until the camp was declared permanent; only then would post plans take priority over mobilization plans.[24] In the meantime, helicopter training was conducted at Ozark Army Airfield, on the sites of former vehicle motor pools, and on parade grounds and other grassy areas around the post. The three principal helicopter base fields consisted initially of converted vehicle motor pools; they were named Southport, Eastport, and Northport.

The major problem with landing helicopters on unimproved terrain was that the native grasses could not withstand the heavy traffic. The grasses were quickly killed, leaving sand, which created serious aircraft maintenance problems. The temporary solutions were to cultivate improved grass, increase the number of landing areas, and stabilize some areas with an emulsified mixture of asphalt and soil.[25]

Post Support Operations

As the principal occupant of Camp Rucker, the Army Aviation School was responsible for organizing support op-

erations for the post. When the school began preparing to move, the only remaining active element at Rucker was the small maintenance force under the post engineer. This force was expanded rapidly from 54 to 215 personnel; it began the work of preparing buildings, the airfield, and stage fields to receive the Aviation School. A medical detachment was activated on 20 August and occupied a small part of the massive complex of World War II hospital buildings.

The Civilian Personnel Office reopened on 2 August 1954; it began processing the transfer of skilled civilian workers from Fort Sill and recruiting additional employees in the Camp Rucker area. Third Army personnel specialists assisted the small staff at Rucker in these efforts. At one time, several hundred people were standing in front of the civilian personnel office waiting for job applications. Within a short time, 644 civil service personnel were employed on post.[26]

The G4 was established at the time of the reactivation of the post in August 1954; it was responsible for logistics support for the school and post, the post telephone system, purchasing and contracting, and other support functions. During the first year, the staff struggled to acquire adequate office and classroom furniture and equipment—much of which was surplus and salvaged equipment that had to be repaired in a field maintenance shop as it arrived from other posts.

The acquisition and handling of fuel and lubricants for the 500 aircraft that moved to Camp Rucker was a major problem for several years. In August 1954, the telephone system consisted of only 300 lines connected to a common battery. A new automatic dial system with 800 additional lines was installed in February 1955. The Purchasing and Contracting Office was established under the G4 in August 1954 with one officer and four civilians; it was completing over 37,000 transactions per year with a total expenditure in excess of $6.5 million by 1957.[27]

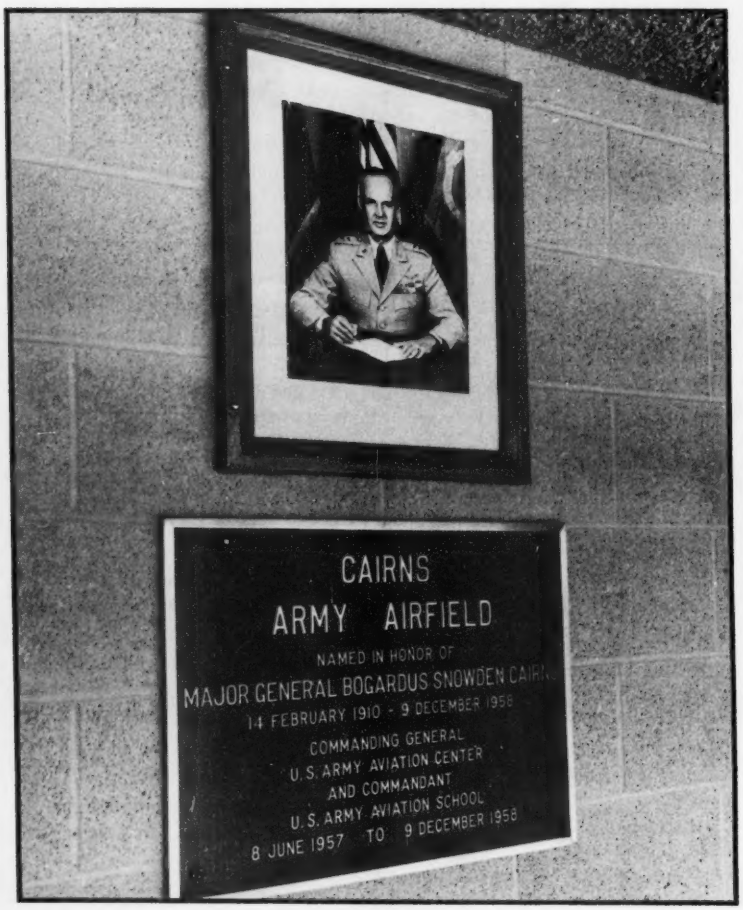
Camp Rucker Becomes Fort Rucker

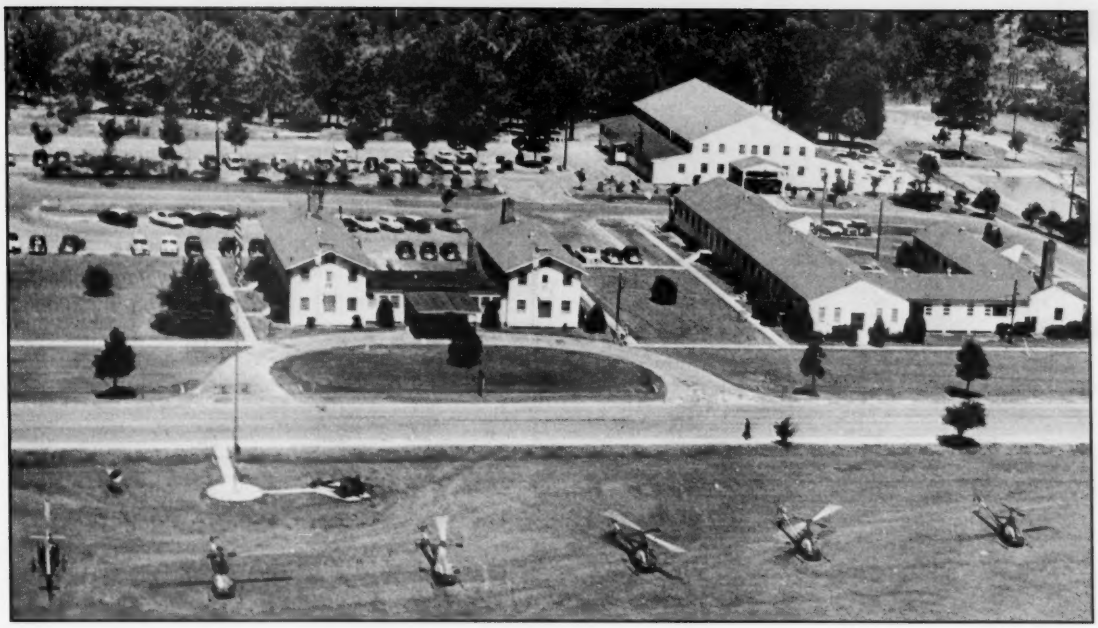
On 1 February 1955, the Army established the U.S. Army Aviation Center at Camp Rucker. The center was to consist of the Army Aviation School and other assigned activities.[28] Although Rucker was still technically a temporary post, the establishment of the Aviation Center indicated permanent status was forthcoming. Eight months later, on 13 October 1955, the post was officially redesignated Fort Rucker; it thereby became a permanent DA installation.[29]

With the achievement of permanent status, long-term planning, permanent construction, and removal of temporary structures became possible. An installation planning board developed a long-range plan providing for construction of facilities in excess of $85,000,000.

Permanent construction projects, begun in 1956, included a hanger at Ozark Army Airfield and a hanger and an operations building at Auxiliary Airfield No. 1 (Lowe). In 1957, work started on family housing projects with a total cost of about $10 million as well as on other major projects at the two airfields. Also in 1957, construction began on the recommended site for a helicopter training base. It was called Auxiliary Airfield No. 2 until it was dedicated as Hanchey Army Heliport in October 1959.[30]

From the time of the move of the Army Aviation School to Alabama, Fort Rucker began its transformation from a temporary infantry training camp to the permanent home of Army Aviation. One by one, the obstacles to this transformation were overcome. Army aviation training and leader development have been gradually consolidated at Fort Rucker, and it has become the world center of Army aviation warfighting. I will describe subsequent events of this process in forthcoming articles in the Aviation Digest.





Notes:

[1]BG Carl I. Hutton, *"Without Trumpets and Drums: Recollections of 36 Months with the Army Aviation School, June 1954-June 1957,"* (manuscript dated December 1957, from copy in Aviation Branch History Office [herein after referred to as ABHO]), pp. 8-10; Richard Tierney and Fred Montgomery, ***The Army Aviation Story***, (Northport, Ala.: Colonial Press), p. 20.

[2]General Orders No. 58, Department of the Army, 29 July 1954.

[3]Hutton, "Without Trumpets and Drums, " p. 20; ***The Army Aviator III***, 7 (July 1954), p. 1-2. ***The Army Aviator*** was the forerunner of the ***Army Flier.***

[4]Hutton, *"Without Trumpets and Drums,"* pp. 9-10; General Orders No. 85, Department of the Army, 15 December 1954.

[5]Ibid., pp. 9-12; MG Hamilton H. Howze, *"The Last Three Years of Army Aviation"*; ***U.S. Army Aviation Digest*** (hereinafter referred to as ***USAAD***), IV, 1 (January 1958), p. 5.

[6]*"U.S. Army Aviation Center History, 1954-1964,"* (Fort Rucker: USAAVNC, 1965), pp. 6, 10.

[7]General Orders No. 85, Department of the Army, 15 December 1954.

[8]Hutton, *"Without Trumpets and Drums,"* p.12, ***Army Aviation***, III, 1 (January 1955), p. 2.

[9]***Army Aviation***, III, 1 (January 1955), p. 2; Howze, *"The Last Three Years of Army Aviation,"* p. 6; *"U.S. Army Aviation Center History, 1954-1964,"* p. 14.

[10]*"Guide for Student Officers,"* (Fort Sill, January 1954), pp. 9-10; ***The Army Aviator,*** III, 7 (July 1954), p. 2; Richard P. Weinert, Jr., ***A History of Army Aviation, 1950-1962*** (Fort Monroe; TRADOC, 1991), p. 94.

[11]*"U.S. Army Center History, 1954-1964,"* pp. 6-21, 46.

[12]*"U.S. Army Aviation Center History, 1954-1964,"* p. 50, passim; notes on telephone interview by author with COL (Ret.) Edward McMaken, 12 January 1994. COL McMaken commanded the Aviation Test Division at Fort Bragg and Fort Sill before moving to Camp Rucker, where he became the first president of CONARC Board No. 6.

[13]*"U.S. Army Aviation Center History, 1954-1964," pp. 13-51.*

[14]Ibid., p. 52.

[15]John Romjue et al., ***Prepare the Army for War: A Historical Overview of the Army Training and Doctrine Command, 1973-1993*** (Fort Monroe: TRADOC, 1993), p. 6.

[16]*"U.S. Army Aviation Center History, 1954-1964,"* p. 29, Hutton, *"Without Trumpets and Drums,"* pp. 61-66.

[17]Howze, *"The Last Three Years of Army Aviation,"* p. 6.

[18]Hutton, *"Without Trumpets and Drums,"* pp. 13-14.

[19]Ibid., p. 15.

[20]Ibid., p. 21, passim.

[21]Ibid., pp. 22-23, passim; *"U.S. Army Aviation Center History,"* pp. 10, 24.

[22]Hutton, *"Without Trumpets and Drums,"* p. 17.

[23]From documents in Memorialization File in ABHO.

[24]Harland Bartholomew and Associates, *"A Report on Criteria, Location, Design, and Function of a Helicopter Maintenance and Training Base,"* 24 October 1955, ABHO files.

[25]From documents in Memorialization File in ABHO.

[26]Hutton, *"Without Trumpets and Drums," pp. 17-18, 26-27; "U.S. Army Aviation Center History, 1954-1964,"* p. 31; *"The Army Aviation Center, G-4 Activities,"* (Fort Rucker), pp. 146-151, ABHO file.

[27]*"U.S. Army Aviation Center History, 1954-1964,"* pp. 25, 31, 44; Notes on telephone interview by author with Ms. Marjorie White, 12 January 1994. Ms. White was one of the very very few employees of Camp Rucker with uninterrupted service from the World War II period through the time that the Army Aviation School moved to Camp Rucker. She retired from the position of director of the Directorate of Civilian Personnel in 1991.

[28]*"U.S. Army Aviation Center History, 1954-1964,"* pp. 27-31.

[29]General Orders No. 17, Department of the Army, 2 March 1955.

[30]General Orders No. 63, Department of the Army, 27 October 1955.

[31]Howze, *"The Last Three Years of Army Aviation,"* p. 6.

[32]*"Fort Rucker MCA Programs [1956-1988],"* ABHO files: also from a list of major construction projects and other documents in Memorialization File in ABHO.

USAASA SEZ

Global positioning systems and instrument flight rules

Walter Perron
Air Traffic Control Specialist
U.S. Army Aeronautical Services Agency
Fort Belvoir, Virginia

We have all seen the wonders of using the global positioning system (GPS) to navigate during Desert Shield/Desert Storm. Thousands of Trimble Trimpacks were purchased by the U.S. Army and used in any number of ways, to include placing them on aircraft instrument panels and glare shields. The system worked, and we found our way around the battlefield and accomplished our missions.

Many U.S. Army aviators believe, erroneously, that they ought to be able to use these same systems to fly according to instrument flight rules (IFR). When we fly in U.S. or foreign civil airspace, usually we must comply with the minimum avionics capabilities each country establishes within its airspace. Although the International Civil Aviation Organization attempts to standardize these requirements, each member state (country) has wide latitude to dictate its own national policies. In the United States, the Federal Aviation Administration (FAA) publishes Technical Standard Orders (TSOs) that specify performance standards for avionics, including navigation systems. TSO C129 establishes the standards for the aeronautical use of GPS receivers; the U.S. Army is required to self–certify that our avionics meet an equivalent level of safety and performance. Various agencies and activities of the U.S. Army Materiel Command, Alexandria, Va., are responsible for this process.

The accuracy and integrity standards of IFR use under TSO C129 must be met for en route and terminal navigation and nonprecision instrument approaches. One key element is that the navigation information must be integrated for display on normal cockpit instruments (liquid crystal displays found on most GPS units **are not** acceptable). Also, the GPS receiver must contain an approved noncorruptible database of aeronautical information (AI). In the future, a differential GPS capability also will be required to execute precision approaches. So far, only the United States and the island–nation of Fiji have approved IFR GPS procedures.

The Department of Defense (DOD) has not yet declared that the GPS constellation has full operational capability for military use. However, it has notified the Department of Transportation that GPS has reached initial operational capability. On 17 February, the FAA administrator declared that civil airlines and general aviation pilots may now navigate IFR en route using GPS receivers certified to TSO C129 standards. Soon the FAA is expected to begin publishing GPS procedures as overlays on selected civil, nonprecision instrument approach procedures so that they also may be flown using an approved GPS system. About 300 additional GPS approaches will be published in the National Ocean Service (NOS) civil terminal instrument procedures books on each 56–day cycle. Initially, each airfield will have only one approach, but approaches requiring distance measuring equipment will not be candidates for use with GPS. Because the Defense Mapping Agency uses NOS negatives to publish civil procedures in DOD flight information publications, military aviators will also see the words "GPS or" on some civil procedures. The latitude/longitude coordinates required to execute GPS approaches **will not** be depicted on the approach plates because flying the procedure mandates the use of the approved internal, noncorruptible AI database.

The U.S. Army has neither a GPS receiver that meets the certification standards for IFR use in any nation's airspace nor a mission–planning station that contains an approved database. Hand–held GPS receivers do not meet IFR standards. Some U.S. Army installations have developed local, GPS–based procedures for IFR use. Such operations are not authorized and contravene Army Regulation 95–2.

GPS may be the primary means of navigation only for the U.S. National Airspace System, Fiji, and short oceanic routes. GPS operations outside the United States must be authorized by the appropriate sovereign authority. For more information, contact the U.S. Army Aeronautical Services Agency (USAASA) or, in Europe, the U.S. Army Aeronautical Services Detachment, Europe (USAASD–E).

U.S. Army Aeronautical Services Agency

USAASA invites your questions and comments and may be contacted at DSN 656–4871 or commercial 703–806–4871; or write to—
Commander, U.S. Army Aeronautical Services Agency, ATTN: MOAS–AI, (Bldg 1466) 9325 Gunston Road, Suite N319, Fort Belvoir, VA 22060–5582 .

Special Operations Aviation

CW5 Clifford L. Brown
Aviation Proponency
U.S. Army Aviation Center
Fort Rucker, Alabama

The passage of the Warrant Officer Management Act (WOMA) and the approval of the Warrant Officer Leader Development Action Plan in 1992 allowed Aviation Proponency to make the special operations aviation (SOA) warrant officer (WO) personnel structure special.

On 30 November 1993, the Headquarters, Department of the Army (DA), Deputy Chief of Staff for Personnel (DCSPER) approved the four–level Standards–of–Grade (SOG) action for aviation warrant officers (AWOs). This action stratified all Aviation Branch warrant officer positions into four distinct levels of utilization based on rank, military occupational specialty (MOS), and skill. A key part of this action created a unique SOG and career utilization pattern for SOA warrant officers.

Aviation warrant officer pilot positions in the SOA have been offset by one grade upward, to the Chief Warrant Officer 3 (CW3) level. This means that there are no rated AWO positions coded for WO (WO1 or CW2) in the SOA.* All SOA positions labeled as "pilot" only have been coded for CW3s while in the remainder of Army aviation "pilot"–only positions have been coded for WOs.

Aviation warrant officer advanced skilled positions have also been offset by one grade upward, to the CW4 level. This includes instructor pilot (IP), maintenance test pilot (MTP), aviation safety officer (ASO), and tactical operations officer. Although these skilled positions have been offset one grade upward, utilization has been offset by one level downward. This means that these CW4 positions are at the company level, not at the battalion level.

Positions for CW5s include four on each battalion staff, four on the regiment staff, and one in each light assault and light attack company. Utilization of CW5s on the battalion staff is MOS–specific and includes standardization instructor pilot (SIP) with special qualifications identifier (SQI) H, ASO with SQI B, aviation materiel officer (AMO)/maintenance test flight evaluator (MTFE) with SQI L, and tactical operations officer with SQI I. Utilization of CW5s on the regiment staff is in MOS 153A, rotary wing aviator–special operations qualified. Positions on the regimental staff are ASO, standardization officer, aviation materiel officer, and tactical operations officer. The CW5 positions in the light assault and light attack companies are for standardization officers and represent the only line–company CW5 positions in the Aviation Branch.

***Note:** This does not prevent CW2s from being accepted into SOA.*

Aviation Proponency Office

Readers may address matters concerning aviation personnel to—
Chief Aviation Proponency Office, ATTN: ATZQ–AP, Fort Rucker, AL 36362–2359.

Update: Unit–Level Logistics System–Aviation (ULLS–A)

CW4 James L. Jernigan
Aviation Materiel Systems Manager
Materiel Requirements Division
Directorate of Combat Developments
U.S. Army Aviation Logistics School
Fort Eustis, Virginia

As the Army continues to modernize, weapons systems become more complex and investment costs rise. With a steady reduction of already limited resources, we must apply intensive efforts toward utilizing the advantages of automation to improve our ability to effectively maintain these high–tech weapons systems. Technological advancements in automation hardware and software now enable us to develop tools that greatly enhance our ability to track and control operating and maintenance expenses. ULLS–A is a fully automated maintenance management system that does just that for Army aviation. See the March/April 1993 issue of the ***Aviation Digest*** for a technical and functional description of ULLS–A.

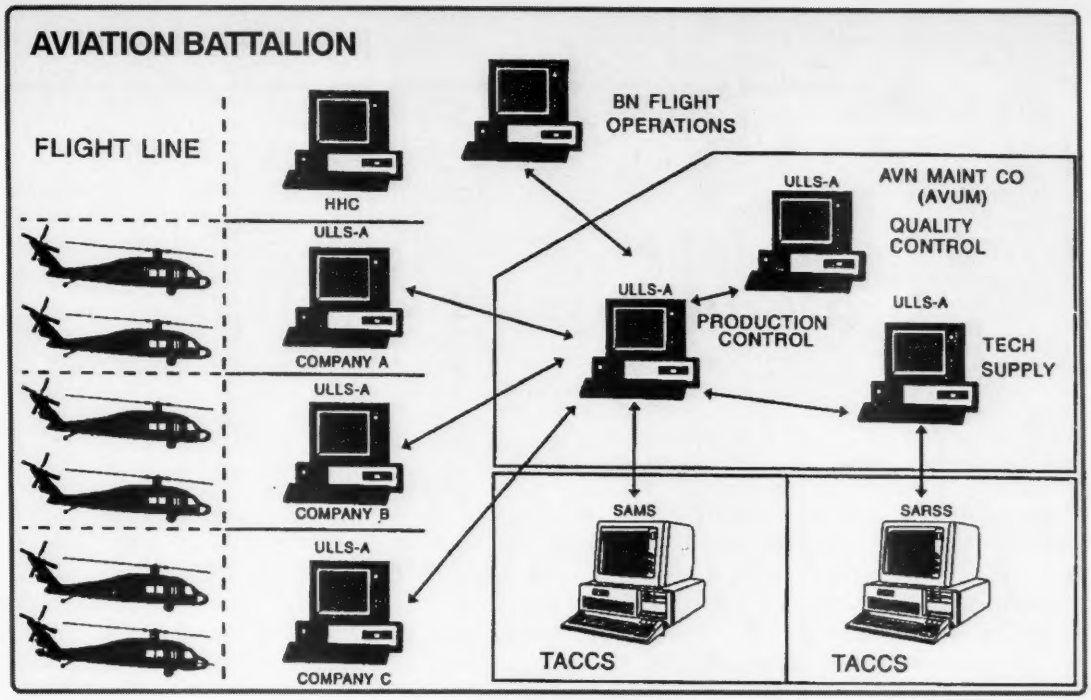
ULLS–A was tested in March 1993 and continues to operate in an extended limited user test (LUT) in the 4th Brigade, 1st Armored Division, Hanau, Germany. The diagram shows the data flow, distribution of hardware, and the software interfaces for a typical aviation battalion.

This effort introduces the first fully automated software and hardware package into an operational aviation maintenance environment. ULLS–A integrates flight line, production and quality control, technical supply, and aircraft readiness/status reporting into a single Standard Army Management Information System (STAMIS). Benefits cited by soldiers using the system include automation of previously labor–intensive logbook entries, fingertip view of real–time aircraft status, on–demand visibility of all aircraft for maintenance and work–load planning, ability to calculate statistics and produce reports tailored to specific operational needs, and improved accuracy of The Army Maintenance Management System–Aviation (TAMMS–A) records.

As new requirements are added and experience is gained through system use, changes and enhancements are implemented into the ULLS–A software baseline through interim change packages (ICP) or software change packages (SCP). Emergency and urgent changes are provided by ICP to the user within 30 days or less. Routine changes and software enhancements/upgrades are distributed to users by SCP and are normally released annually.

Interim Change Package 03 was tested at Fort Lee, Va., and released to the LUT site in December. This ICP incorporates the Army's Combat Service Support Automated Information Systems Interface–Near Term Fix (CAISI–NTF). The CAISI–NTF came about as a result of communications shortcomings identified during Operation Desert Shield/Storm. The NTF uses a concentrator interface to implement electronic information exchanges between STAMISs. Other changes incorporated in this ICP include commander's comments and logistics data for the Army Materiel Status System (AMSS), an improved data transfer process between the flight–company computers and the local area network (LAN) at the aviation unit maintenance (AVUM), and an internal and external task–organization process.

In today's mobile Army, the ability to task organize efficiently and effectively for contingency operations is essential to mission success. With little precedence or guidance, automating a task–organization process that meets logistics and operational requirements, including the capability to task organize internally (within the reporting unit identification code (UIC)) and externally (under another reporting UIC), was extremely challenging. Completion of this effort has proven beneficial to Army aviation by establishing and standardizing task–organization procedures. ULLS–A allows the user to quickly configure hardware to meet any contingency requirement with a built–in ability to maintain continuity of aircraft records,



Unit–Level Logistics System–Aviation data flow

work orders, repair parts, and status reporting.

A limited fielding of ULLS–A was initially scheduled for fiscal year (FY) 94 to contingency corps units at Fort Campbell, Ky.; Fort Bragg, N.C.; Hunter Army Airfield, Savannah, Ga.; Fort Drum, N.Y.; and the 1st Cavalry Division, Fort Hood, Tex. The fielding was postponed until completion of an initial operational test and evaluation (IOTE), a new software testing requirement. The Aviation Brigade, 1st Cavalry Division, was selected to conduct IOTE. Training of unit personnel, conversion of aircraft records, and installation of system hardware began in October. The product manager (PM) ULLS will develop a strategy and schedule for Armywide fielding after successful completion of the IOTE, tentatively scheduled for the July–September FY94 time frame.

Currently, officer professional development (OPD) courses, including the Aviation Officers Basic and Advanced Courses, Warrant Officer Senior Course, Officer and Warrant Officer Initial Entry Rotor Wing Courses (OPD phase), Maintenance Manager/Maintenance Test Pilot Course (MM/MTPC), and military occupational specialty (MOS) 151A Aircraft Maintenance Technician Certification Course receive an introduction and overview of ULLS–A. Training will be fully integrated into these courses when the system is approved for Armywide fielding. ULLS–A training will also be integrated into career management field 67 advanced individual training, and basic and advanced noncommissioned officer courses (BNCOC and ANCOC). A combination of classroom and hands–on instruction is planned for each course. Training is scheduled to begin in FY95; however, success of the IOTE, the progress of subsequent Armywide fielding, and funding will determine actual school conversion and training start dates.

The objective system for ULLS–A is a paperless logbook system. One computer per aircraft will be issued; system software enhancements, along with policy and procedure changes, must be in place before a paperless logbook system can be fielded. Design for the objective system is scheduled for a future developmental effort.

We must persistently support the fielding, maturation, and growth of ULLS–A and continue to work diligently to progress and expand our automated management and status reporting systems into the twenty–first century. Aviation soldiers are our greatest resource. They must be provided the best tools possible. We owe them nothing less.

U.S. Army Aviation Logistics School

Readers may address matters about aviation logistics to—
Assistant Commandant, U.S. Army Aviation Logistics School, ATTN:ATSQ–LAC, Fort Eustis, VA 23604–5415.

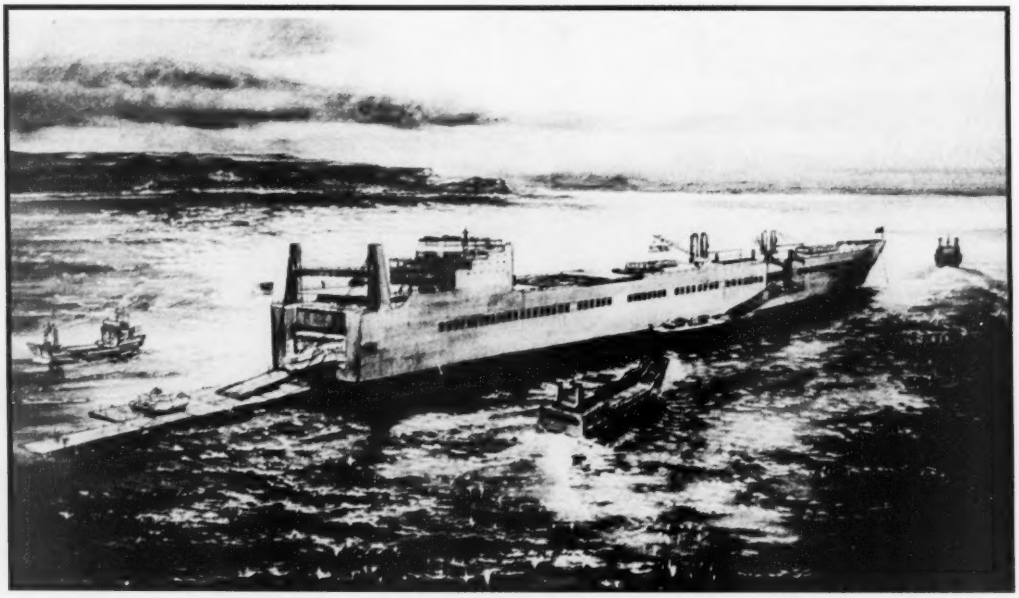
Strategic Sealift Program

Mr. Wayne E. Hair
Public Affairs Officer
U.S. Army Test and Experimentation Command
Fort Hood, Texas

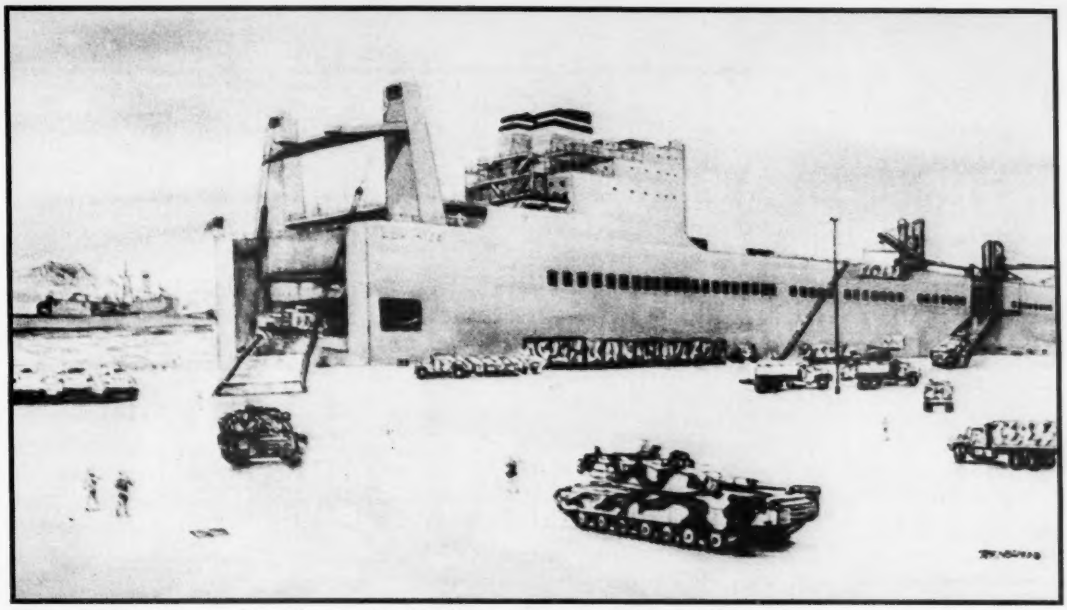
As part of the Department of Defense Strategic Sealift Program, the U.S. Army Test and Experimentation Command (TEXCOM) plans to head off for the high seas in 1995 when it conducts a joint operational test of ships converted for the purpose of pre–positioning a tank–heavy task force.

Using National Defense Sealift funds appropriated by Congress, the U.S. Navy awarded contracts for the conversion and construction of strategic sealift ships in 1993. The ships will be loaded with U.S. Army equipment and pre–positioned near international hot spots. To meet near–term pre–positioning requirements, the Naval Sea Systems Command also awarded two contracts for conversion of five ships in July 1993. The first operational tests will be conducted with two of the converted ships in 1995. In September 1993, two U.S. shipyards were each awarded a contract for the construction of one new strategic sealift ship with options for up to five additional ships. Operational tests with the new construction ships are planned for 1998.

Both the converted and new construction ships are large, medium–speed cargo vessels, with climate–controlled holds, designed to pre–position and transport military unit equipment. Designed with a self–sustaining, roll–on/roll–off (RO/RO) capability and lift–on/lift–off (LO/LO) capabilities for cargo operations at pierside and off–shore, the ships will be U.S. flagged and it is anticipated that they will



In addition to pierside capabilities, the versatile strategic sealift ship can discharge its cargo off–shore, using a variety of off–shore transporting equipment.



The primary means of loading and unloading of the strategic sealift ship is at pierside using both the roll–on/roll–off and lift–on/lift–off capabilities.

be operated by a private sector company under contract to the Military Sealift Command and crewed by U.S. merchant marine personnel.

TEXCOM testers from the Engineer and Combat Support Test Directorate stationed at Fort Hood, Tex., will be collecting data on the RO/RO and LO/LO load and discharge rates for the various items of Army equipment and to validate the capability to conduct operations in a chemical, biological, and radiological environment.

Unlike most other operational tests, highly sophisticated instrumentation specially designed to collect data will be traded for pocket calculators, clipboards, and stubby pencils. However, according to the Deputy Test Director of the Joint Test Team and Army test officer, Larry Coon, the results will be the same, "data to verify the truth in advertising"—whether the ship performs as required by the military services and advertised by the shipbuilder.

U.S. Army Test and Experimentation Command

Readers may address matters concerning test and experimentation to—
Headquarters, TEXCOM, ATTN: CSTE–TCS–PAO, Fort Hood, TX 76544–5065.

U.S. Army Class A Aviation Flight Mishaps

Fiscal Year	Number	Flying Hours	Rate	Military Fatalities	Total Cost (in millions)
FY 93 (October 1992 through February 1993)	14	488,667	2.86	16	$67.60
FY 94 (October 1993 through February 1994)	10	488,667 (estimated)	2.05	4	$29.00

ATC Focus

Fixed–Base Air Traffic Control Modernization

Mrs. Betty J. Lewis, Mr. Eugene P. Redahan, and Mr. David M. Fonda
Air Traffic Control Specialists
Air Traffic Control Fixed–Base Requirements Division
U.S. Army Air Traffic Control Activity
Fort Rucker, Alabama

Over the past seven years, the U.S. Army Air Traffic Control Activity (USAATCA) at Fort Rucker has spent numerous man–hours developing required acquisition documentation for procuring state–of–the–art air traffic control (ATC) equipment. There have been many pitfalls, roadblocks, and a general attitude of uncertainty as to the players in the process. The Department of Defense acquisition regulations require that a certain chain of events must take place before a milestone decision is made. Researching and compiling this information has been a long and tedious process as well as an education to all of us associated with the acquisition process.

As you are well aware, there are ATC systems in the field that have far exceeded their life–cycle expectancy. These systems have become unsupportable and very expensive to maintain. In a concerted effort with the product manager for ATC (PM–ATC), we finally bring you good news. Two new ATC systems will be fielded in the very near future. The USAATCA and PM–ATC have completed all of the required documentation to acquire a replacement for the antiquated AN/TNH–24(V) recorders and obsolete AN/FSW–8 communications console.

The AN/TNH–24(V), along with all other ATC recorders/reproducers (a total of five different systems), will be replaced starting in October. The system to be fielded consists of a Magnasync 60–channel, dual–deck recorder; a single–deck, 60–channel reproducer with a built–in Technics dual–deck cassette; and a degausser unit. The 60–channel recorder will have an estimated 24,000–hour mean time between failure, which is great news to maintenance personnel trying to keep their AN/TNH–24(V)s on–line. The PM currently plans to field this system using the two–level maintenance concept with the Army using the Federal Aviation Administration (FAA) depot for maintenance support.

Meanwhile, the Army should have reached a milestone decision for the replacement of the AN/FSW–8 communications console with a new state–of–the–art communications console system. The proposed replacement system is a four–position tower system with a minimum of eight frequency selectors and eight telephone selectors per position. This system also will have expansion capability. The PM plans to field this system with a two–level maintenance concept. The first facility equipped is programmed for late fiscal year (FY) 95.

Also, USAATCA has initiated action to replace all of the Army's AN/FPN–40 Precision Approach Radar (PAR) Systems. Documentation has been forwarded to the Department of the Army to gain approval, which begins the replacement process. The planned acquisition strategy will be to field the same system in the fixed–base environment as is being fielded to the tactical environment. This strategy will provide a common training and logistics base for the two systems. The Army is approaching the Milestone I/II decision to replace the Army's AN/TPN–18 tactical PAR with a new system, which is referred to as the air traffic navigation, integration, and coordination system (ATNAVICS). The program will allow the Army to field the fixed–base system with the ATNAVICS earlier than previously programmed.

This activity is also heavily involved in establishing the Army's requirements for the Department of Defense/National Airspace System (NAS) capital investment plan (CIP) equipment modernization. The equipment, which will be upgraded at selected continental United States Army ATC facilities, includes the same type of equipment that will be going into FAA facilities. These systems will include the Terminal Advance Automation System, Enhanced Terminal Voice Switch, and Tower Control Computer Complex. Initial fielding is expected in FY 99. Even though this may seem a long time away, the program is very active. Actual site surveys will commence in the very near future. More details on the planned equipment will be highlighted in future *ATC Focus* articles.

So, there it is—after all these years, something new in ATC appears on the horizon. These three programs are only a start. The CIP will modernize selected continental United States facilities. New mission–need statements will be initiated as other ATC systems meet their life–cycle expectancy.

U.S. Army Air Traffic Control Activity

Readers may address matters concerning air traffic control to—
Commander, USAAVNC,
ATTN: ATZQ–ATC–MO, Fort Rucker, AL 36362–5265.

Command Sergeant Major Fredy Finch Jr

Army Forms Tuition Assistance Task Force

The Army's recently formed Tuition Assistance Task Force (TATF) is responding to the growing concern throughout the Army about increased demand for tuition assistance and the adequacy of tuition assistance programs for soldiers.

"Soldiers are worried about the tuition assistance program. TATF is our way of saying we hear you and we're responding," says task force co–chair Deputy Assistant Secretary of the Army for Training, Education and Community Support Todd A. Weiler. TATF is developing policy to provide soldiers a clear statement of what tuition assistance they can expect to receive, regardless of when or where they use it.

Soldiers use college courses to remain competitive in a smaller Army and to prepare for civilian employment after separation. But increased demand, coupled with a strain on funds available for education, leaves soldiers unsure of the tuition–assistance money available to them from semester to semester, and from installation to installation.

Over the past five years, the demand for tuition assistance and the cost of an average college education have risen substantially. During 1990, for about 220,000 enrollments, Army tuition assistance totaled about $32 million. The continuing drawdown spurred enrollments to 260,000 in 1993, and tuition assistance costs increased to $41 million.

Established by the Assistant Secretary of the Army for Manpower and Reserve Affairs and the Deputy Chief of Staff for Personnel, co–chair of the task force is shared between Weiler and Sergeant Major of the Army Richard Kidd. Other TATF members come from training, personnel, and education and support staffs from Army headquarters to installation levels.

"Tuition assistance is our number–one recruiting and retention tool," says Weiler. "TATF is part of the Army's tie to the National Performance Review. Our goal is to be more responsive to our customers—our soldiers."

Kidd emphasizes that while a college degree isn't required in the enlisted ranks, "the competitive nature of our enlisted soldiers virtually necessitates that they pursue a degree to remain competitive among their peers. Ensuring the availability of tuition assistance for our soldiers is good for the soldier and helps to maintain the quality force that will take us to the twenty–first century."

The TATF's recommendations will be developed over the next several months and should be in place by the end of this fiscal year.

For further information, contact MAJ Linda Ritchie, Army Public Affairs, Media Inquiries Branch, at (703) 697–7589.

HELICOPTER GUNNERY: A NEW FOCUS

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As defense budgets shrink, many programs and installations are reorganizing to become more efficient. Besides making our hardware programs more efficient, we also must modify the way we execute our training programs. This includes Army aviation's helicopter gunnery program.

For many years helicopter gunnery training has been a subjective program with only generally defined weapons capabilities and standards. In addition, there have been wide variances in helicopter gunnery programs throughout the Army. Because of these shortcomings, Army aviation is in the process of changing helicopter gunnery standards from subjective to objective like the Armor and Infantry Branches did in the early 1980s.

An objective gunnery training and evaluation program does three things to support our warfighting focus. First, it gives our commanders and crews realistic training and evaluation standards based on weapon systems capabilities. Second, it allows us to use our resources more effectively and efficiently in training to a warfighting standard. Finally, it allows Army aviation to administer a uniform, disciplined helicopter gunnery program across the branch.

To focus our helicopter gunnery program, we are working on three initiatives: the new FM 1-140, Helicopter Gunnery; more emphasis on helicopter gunnery training at the U.S. Army Aviation Warfighting Center; and development of a master gunner program.

The draft FM 1-140 was released to the field 1 December 1993. Development of this manual represents a joint effort between the U.S. Army Aviation Warfighting Center and units from the field. We have received a tremendous amount of information and help from units across Army aviation. We intend to continue this positive, two-way communication as we finalize FM 1-140 during the fourth quarter of FY94. As you read through FM 1-140, you will find it's objectives to be defined standards, objective scoring, and progressive training.

FM 1-140 is a large manual, but it is laid out in a logical sequence. The purpose behind FM 1-140 is to have all Army aviation helicopter gunnery training conducted in a single standard way. Chapters 1 through 5 are the foundation of the helicopter gunnery program. These chapters lay out the gunnery training strategy; define the standards; and provide information on munitions, ballistics, and how to set up and operate a firing range. The standards listed have been aligned with the capabilities of the weapon systems. These five chapters apply to all aviation units.

Chapter 6 through 9 are completely new; they address the tactics, techniques, and procedures of fighting the weapon systems. Chapters 6 and 7 focus on crew warfighting and engaging targets.

Illustration By: SSG T. King

Chapter 8 covers the Master Gunner. Appendix A, Door Gunnery, has been completely rewritten. It outlines a training program beginning with M60 machinegun ground qualification and culminating with live fire multiship operations. As these examples show, the new FM 1-140 is a warfighting training manual with a clear focus. After you've looked at FM 1-140, it's important that you provide feedback to the U.S.Army Aviation Center. Along with this new FM, we will determine how we can further enhance the gunnery training at the Center. Please contact the Commander, USAAVNC, ATTN: ATZQ-TDA-G (Helicopter Gunnery), Fort Rucker, AL 36362-5000, DSN: 558-2452/3467, FAX: 558-9176.

The interim change to TC 1-140 established the Master Gunner as an additional duty. The Master Gunner provides focus for a continual gunnery program. The gunnery program should be one that will maintain a constant high readiness level without peaks and valleys associated with a gunnery program solely based on a single annual visit to the live fire range. The draft FM 1-140 explains more of the details of what a Master Gunner is and his associated duties.

We are currently working to establish a table of organization and equipment (TO&E) position at the battalion/squadron for the Master Gunner. In doing so, a career progression for this individual must be developed, along with a course of instruction that qualifies the individual as a Master Gunner with an additional skill identifier for tracking. The Master Gunner at the brigade level will be an additional duty. Although this program is in its infancy, feedback from the field on the additional duty Master Gunner is very positive. We will put together a concept paper for staffing to the field before a Master Gunner course and TO&E position is finalized.

Army aviation's helicopter gunnery program is on track. It is on the way to becoming an objective program with defined standards. We have made great headway, but communication from the field is a must if the gunnery program is to be successful.

JUST WHAT IS THIS OPSEC THING ?

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OPSEC, as we all know, stands for Operations Security. But, for many of us, that about sums up our understanding of OPSEC. Even though we have received training in the process throughout our careers, application of OPSEC procedures is still foreign to some. The better we understand OPSEC, the better we will be able to support today's mission, and protect our soldiers on tomorrow's battlefield. In our increasingly complex military operations that include even more complex weapons systems and other technology, commanders and their staffs systematically must address OPSEC on a continuing basis. OPSEC must be applied throughout the entire operational continuum.

When most of us think of threat, we think of the physical threat to our soldiers on the battlefield. But there is another threat that, if not countered, will add to the physical threat our soldiers will face from tomorrow's adversary. According to our security experts, the greatest threat in the near term and foreseeable future is expected to be in unauthorized transfer of technology.

As our forces dwindle in size and number, we will depend more on the force multiplier of superior technology. If technology is our force multiplier, a surprise countering of our newest technology could be considered the ultimate force detractor. One thing a soldier in combat does not need is to be surprised. The unauthorized transfer of critical information and technology can be greatly curtailed by following the procedures included in the OPSEC process.

Some Misconceptions

OPSEC is a state of security; an end result of vigilance. Not true. OPSEC is a continuing day–to–day process.

A significant part of OPSEC is aimed at counterterrorism. Not true. Potential terrorists may seek to gain information about our operations and technology; however, countering terrorism is not considered a function of OPSEC.

OPSEC has to do with physical security. While physical security is important to, and should complement, all other security, it should not be mistaken as part of OPSEC.

OPSEC is a function of the Security Office. Again, not true. OPSEC is a function of *operations*. Army Regulation 530–1, Operations Security (OPSEC), prescribes that the staff component responsible for OPSEC will be in the operations section of the staff.

OPSEC is all about protecting classified information. Partially true. While protecting classified information is certainly an important part of OPSEC, saying that is its only, or even primary, function is like saying the job of a police force is to show up in time to arrest a suspect. There's a lot more to it than that.

What OPSEC Really Is

OPSEC is about protecting essential secrecy by complementing traditional security measures. Instead of saying OPSEC is all about protecting classified information, it would be more accurate to say that OPSEC is about protecting *unclassified* information. You might say: Wait a minute! If the information is that sensitive, why not just classify it?

Well, not all information about a particular operation or procurement of equipment using a new technology can be classified. Nor should it. There are, necessarily, many routine and unclassified aspects about supporting almost any operation. Not every action necessary to accomplish a given mission can be classified. Therein lies the hazard. If you piece together enough evidence (indicators), you or an adversary could very well know more about an operation than should be known.

The traditional security programs, such as information security, personnel security, etc., serve to protect classified information. While also supporting those disciplines, OPSEC is concerned more with other, routine actions that underlie sensitive operations or activities.

Let's look at the definition of OPSEC.

According to AR 530–1, OPSEC

is a process of analyzing friendly actions attendant to military operations and other activities to—

Identify those actions that can be observed by adversary intelligence systems.

Determine *indicators* hostile intelligence systems might obtain that could be interpreted or pieced together to derive critical information in time to be useful to adversaries.

Select and execute measures that eliminate or reduce to an acceptable level the *vulnerabilities* of friendly actions to adversary exploitation.

As you can see, OPSEC is a functional process of operations. The operations element of an organization knows best every action that is required in an operation. Operations can best analyze actions to determine which are most sensitive. Once sensitive actions are determined, operations personnel are best positioned to devise methods of protecting the actions, or indicators of actions, against timely interpretation by an adversary.

OPSEC is not an end result, but a never–ending process of analyzing our operations and taking protective measures where needed.

What we have to watch out for, besides controlling obviously protected sensitive information, are indicators that might lay out a road map of our intentions or capabilities.

The sources of these indicators may be open, as in oral, documentary, pictorial, and physical materials accessible to the public. Sources may also be detectable actions that can be observed by the human senses, photographed, or otherwise detected by sensors.

What Do Indicators Look Like?

The three basic types of indicators are profile, deviation, and tipoff.

Profile indicators: These indicators can help an adversary by profiling our organizational structure and procedures. Items such as table(s) of organization and equipment/tables of distribution and allowances (TOEs/TDAs) or Organization and Functions Manuals are obvious sources of profile information; however, such innocuous things as telephone directories or "line and block" charts also can provide a wealth of information.

Deviation indicators: Armed with a profile of our normal organization and/or procedures, an indicator of a deviation from that norm might reveal future actions. Abrupt changes in training, assignment of units, or increased security, without an adequate explanation, might alert or even reveal to an adversary our planned actions.

Tipoff indicators: Occasionally, something we do will blatantly reveal our actions and tipoff an adversary to our intentions. Premature release of operational information to the news media could be put in this category.

What Should We Protect?

Each commander must decide, with the help of the OPSEC officer, exactly what information is critical, and should and can it be protected. Once the critical information is determined, the essential elements of friendly information (EEFI) must be identified. EEFI are key questions about friendly intentions, activities, or military capabilities likely to be asked by an adversary intelligence operative. In developing EEFI, OPSEC planners must put themselves into the potential adversary's place, and look at the organization from the adversary's point of view.

All assigned personnel must be made aware of the EEFI list. Soldiers and employees must be aware of what should be protected. They can then be alert to and safeguard information about actions attendant to sensitive operations.

There is no question commanders must have an active, viable OPSEC program in place. The only question is what measures will be incorporated to stem the unauthorized release of critical information. Selection and use of protective measures are decisions for each commander.

Guidance from the chairman of the Joint Chiefs of Staff –level down is clear; OPSEC is as critical now as ever.

The United States Army Aviation Digest is published every other month. The Digest contains the latest information on aviation training and doctrine, tactics, maintenance, operations, research and development, aviation medicine, aircraft accident prevention, safety, and air traffic control. The Digest is for sale to individuals through the Superintendent of Documents, United States Government Printing Office. Orders for yearly subscriptions can be paid by check for $14.00 ($17.50 foreign) or by VISA or MasterCard by furnishing charge card number and expiration date to Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15220–7954 (FAX —202–512–2233). Individual copies of current issues of the Digest may also be available for $4.25 each ($5.31 foreign). Prices are subject to change.

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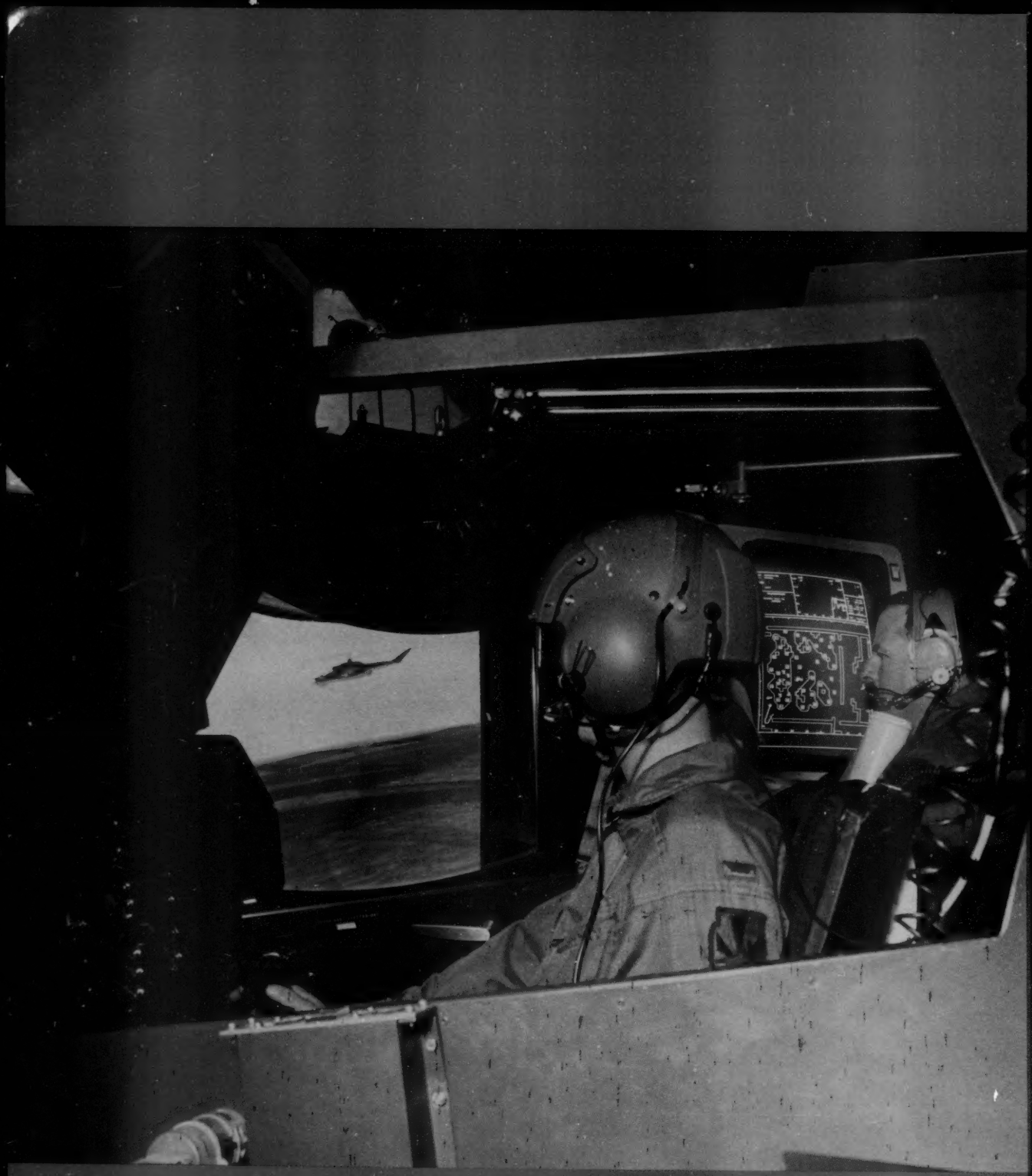
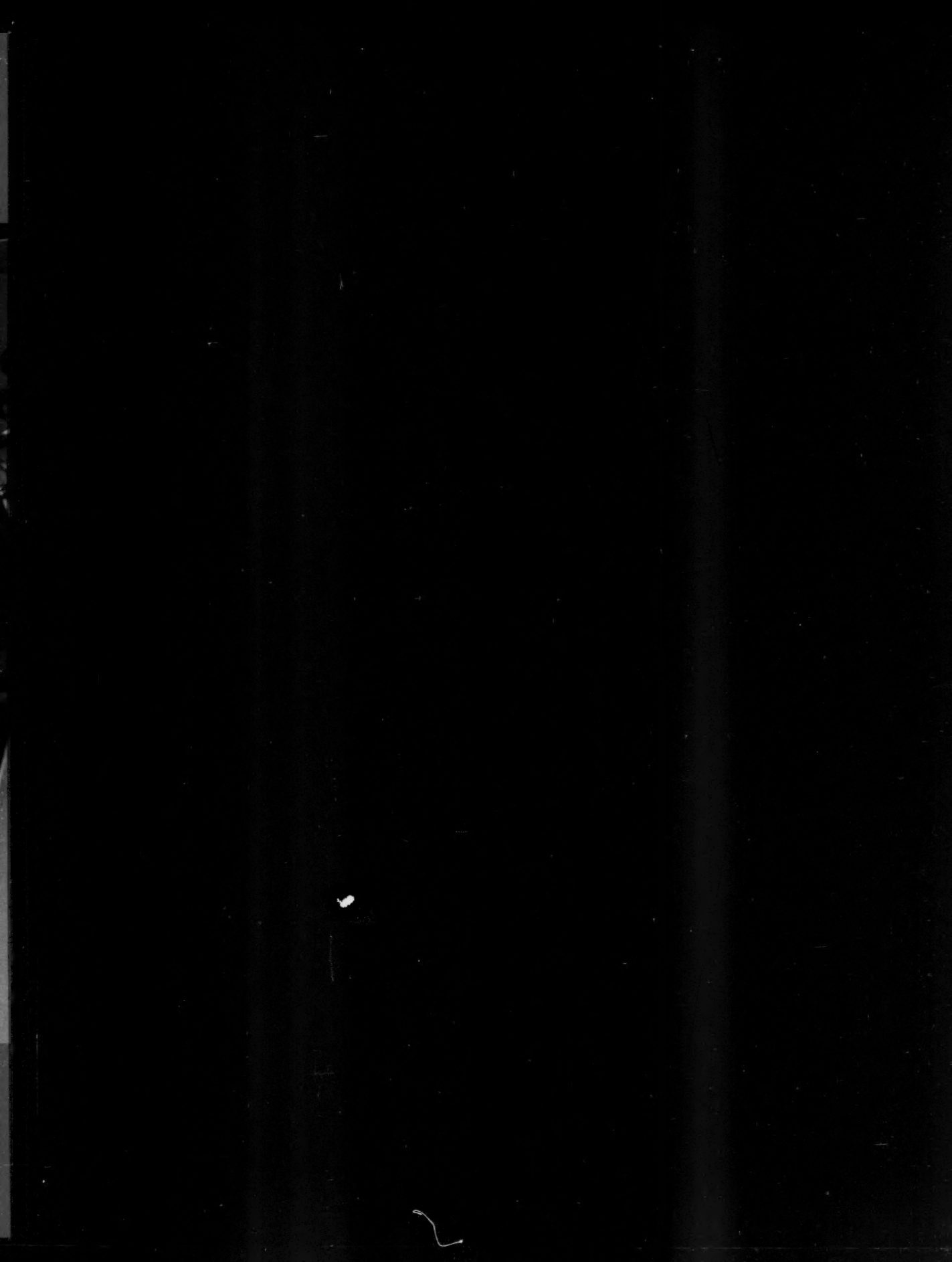
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